Final

Site Investigation Report
Former Range 41, Parcel 95Q and
Impact Area, Choccolocco Corridor, Parcel 131Q-X

Fort McClellan
Calhoun County, Alabama

Prepared for:

U.S. Army Corps of Engineers, Mobile District
109 St. Joseph Street
Mobile, Alabama 36602

Prepared by:

Shaw Environmental, Inc.
312 Directors Drive
Knoxville, Tennessee 37923

Task Order CK10
Contract No. DACA21-96-D-0018
Shaw Project No. 796887

January 2004

Revision 0

Table of Contents

Page

Table of Contents (Continued)

Page

List of Appendices

List of Tables

List of Figures

Executive Summary

In accordance with Contract Number DACA21-96-D-0018, Task Order CK10, Shaw Environmental, Inc. (Shaw) completed a site investigation (SI) at Former Range 41, Parcel 95Q, and Impact Area, Choccolocco Corridor, Parcel 131Q-X, at Fort McClellan in Calhoun County, Alabama. The SI was conducted to determine whether chemical constituents are present at the site as a result of historical mission-related Army activities. The SI consisted of the collection and analysis of 15 surface soil samples, 3 depositional soil samples, 15 subsurface soil samples, 3 groundwater samples, 2 surface water samples, and 2 sediment samples. In addition, 4 permanent monitoring wells were installed in the saturated zone to facilitate groundwater sample collection and to provide site-specific geological and hydrogeological characterization information.

Chemical analysis of samples collected at the site indicates that metals, volatile organic compounds (VOC), one pesticide, and one explosive compound were detected in site media. Neither semivolatile organic compounds nor herbicides were detected in any of the samples collected. To evaluate whether the detected constituents pose an unacceptable risk to human health or the environment, analytical results were compared to human health site-specific screening levels (SSSL), ecological screening values (ESV), and background screening values for Fort McClellan.

Constituents detected at concentrations exceeding SSSLs and background (where available) were identified as chemicals of potential concern (COPC) in site media. COPCs were limited to six metals in surface and subsurface soil. The most significant COPC was lead, which exceeded its residential SSSL in three surface soil samples. No COPCs were identified for groundwater, surface water, or sediment. VOC, pesticide, and explosive compound concentrations in site media were all below SSSLs.

Constituents detected at concentrations exceeding ESVs and background (where available) were identified as constituents of potential ecological concern (COPEC) in surface soil, surface water, and sediment. COPECs identified included several metals in surface soil and copper in one sediment sample. No COPECs were identified for surface water.

Based on the results of the SI, past operations at Parcels 95Q and 131Q-X have impacted the environment. Therefore, Shaw recommends that a remedial investigation be conducted to determine the extent of metals contamination in soil at Former Range 41, Parcel 95Q, and Impact Area, Choccolocco Corridor, Parcel 131Q-X.

1.0 Introduction

The U.S. Army has selected Fort McClellan (FTMC), located in Calhoun County, Alabama, for closure by the Base Realignment and Closure (BRAC) Commission under Public Laws 100-526 and 101-510. The 1990 Base Closure Act, Public Law 101-510, established the process by which U.S. Department of Defense (DOD) installations would be closed or realigned. The BRAC Environmental Restoration Program requires investigation and cleanup of federal properties prior to transfer to the public domain. The U.S. Army is conducting environmental studies of the impact of suspected contaminants at parcels at FTMC under the management of the U.S. Army Corps of Engineers (USACE)-Mobile District. The USACE contracted Shaw Environmental, Inc. (Shaw) (formerly IT Corporation [IT]) to perform the site investigation (SI) at Former Range 41, Parcel 95Q, and Impact Area, Choccolocco Corridor, Parcel 131Q-X, under Contract Number DACA21-96-D-0018, Task Order CK10.

This report presents specific information and results compiled from the SI, including field sampling and analysis and monitoring well installation activities conducted at Parcels 95Q and 131Q-X.

1.1 Project Description

Parcels 95Q and 131Q-X were identified as areas to be investigated prior to property transfer. The sites were classified as Category 1 Qualified parcels in the *Final Environmental Baseline Survey, Fort McClellan, Alabama* (EBS) (Environmental Science and Engineering, Inc. [ESE], 1998). Category 1 Qualified parcels are areas that have no evidence of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)-related hazardous substance or petroleum product storage, release, or disposal but that do have other environmental or safety concerns. Parcels 95Q and 131Q-X were qualified because chemicals of potential concern (COPC) and/or unexploded ordnance (UXO) may be present as a result of historical range activities.

A site-specific work plan, comprised of a field sampling plan (SFSP), a safety and health plan, and a UXO safety plan, was finalized in April 2002 (IT, 2002a). The work plan was prepared to provide technical guidance for SI field activities at Parcels 95Q and 131Q-X. The site-specific work plan was used as an attachment to the installation-wide work plan (IT, 1998) and the installation-wide sampling and analysis plan (SAP) (IT, 2000a; 2002b). The SAP includes the installation-wide safety and health plan and quality assurance plan.

The SI included fieldwork to collect 15 surface soil samples, 3 depositional soil samples, 15 subsurface soil samples, 3 groundwater samples, 2 surface water samples, and 2 sediment samples to determine whether potential site-specific chemicals are present at the site.

1.2 Purpose and Objectives

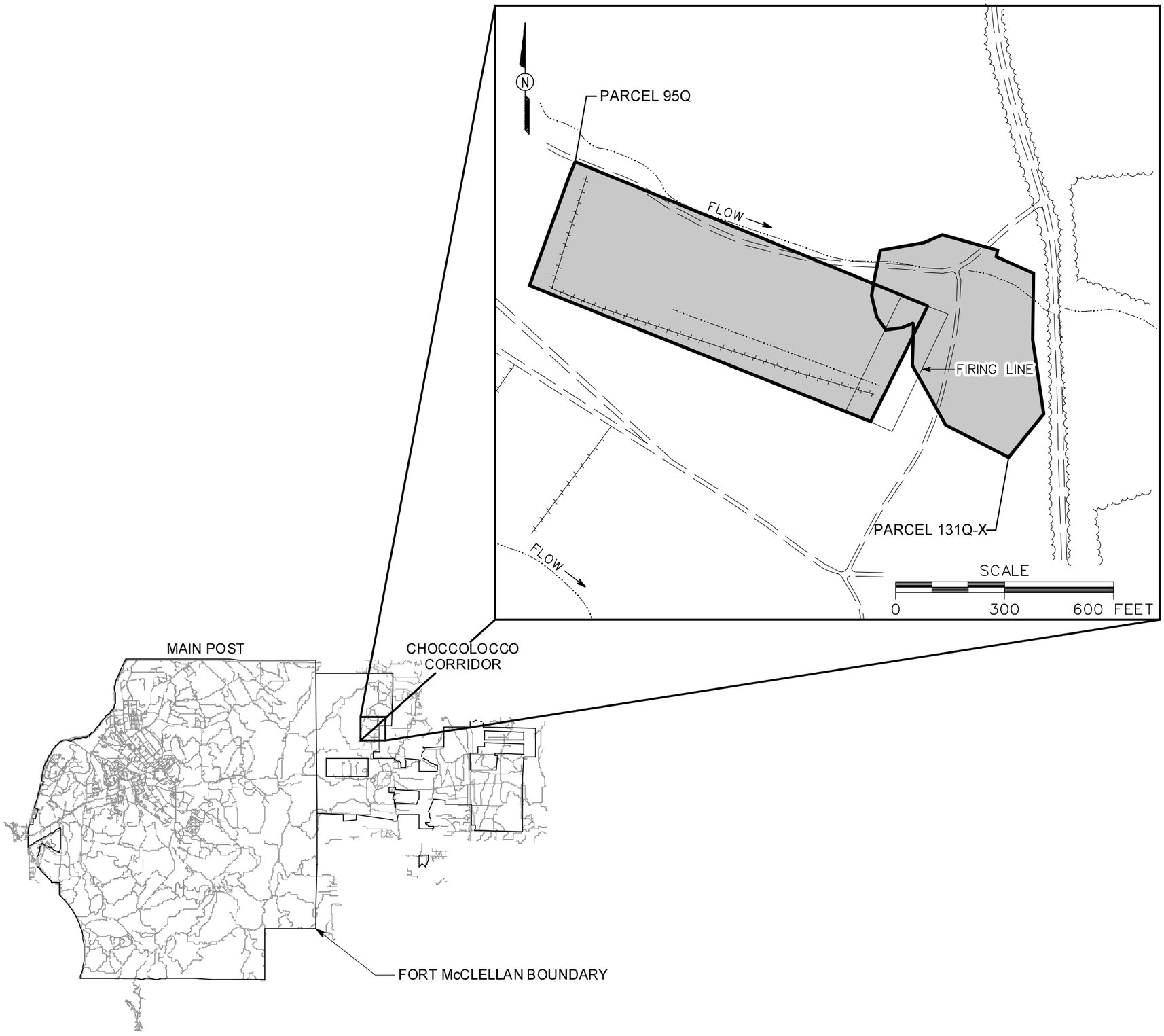
The SI program was designed to collect data from site media and provide a level of defensible data and information in sufficient detail to determine whether chemical constituents are present at Parcels 95Q and 131Q-X at concentrations that pose an unacceptable risk to human health or the environment. The conclusions of the SI in Chapter 6.0 are based on the comparison of the analytical results to human health site-specific screening levels (SSSL), ecological screening values (ESV), and background screening values for FTMC. The SSSLs and ESVs were developed by Shaw as part of the human health and ecological risk evaluations associated with SIs being performed under the BRAC Environmental Restoration Program at FTMC. The SSSLs and ESVs are presented in the *Final Human Health and Ecological Screening Values and PAH Background Summary Report* (IT, 2000b). Background metals screening values are presented in the *Final Background Metals Survey Report, Fort McClellan, Alabama* (Science Applications International Corporation, 1998).

Based on the conclusions presented in this SI report, the BRAC Cleanup Team will decide either to propose "No Further Action" or to conduct additional work at the site.

1.3 Site Description and History

Former Range 41, Parcel 95Q, and Impact Area, Choccolocco Corridor, Parcel 131Q-X, are located in training area 14G within the Choccolocco Corridor, east of the FTMC Main Post (Figure 1-1). Choccolocco Corridor was leased from the State of Alabama by Fort McClellan for land navigation, military police driving, U.S. Army Chemical School training, and as a bivouac area. The lease for Choccolocco Corridor was terminated in 1998.

Former Range 41, Parcel 95Q, covers approximately 8 acres. There are conflicting reports of the dates of use for Parcel 95Q, but the area was most likely active during the 1960s and 1970s. The historical use of Former Range 41 is unclear. The range appeared on 1966 and 1971 historical maps, which would coincide with reports from FTMC personnel who indicate that this range was a small-arms range used during the Vietnam War era (ESE, 1998). Direction of fire was toward the northwest.



LEGEND

- UNIMPROVED ROADS AND PARKING
- TREES / TREELINE
- PARCEL BOUNDARY
- SURFACE DRAINAGE / CREEK
- BERM

FIGURE 1-1
SITE LOCATION MAP
FORMER RANGE 41, PARCEL 95Q
IMPACT AREA, CHOCCOLOCCO
CORRIDOR, PARCEL 131Q-X

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

Shaw™ Shaw Environmental, Inc.

DWG. NO.: ...\796887es.647 | PROJ. NO.: 796887
INITIATOR: G. SISCO | PROJ. MGR.: J. YACOUB
DRAFT. CHCK. BY: | ENGR. CHCK. BY: S. MORAN
DATE LAST REV.: | DRAWN BY:
STARTING DATE: 01/02/03 | DRAWN BY: D. BOMAR
1/20/2004 8:32:28 AM
lstout
c:\cadd\Design\796887es.647

The *Archives Search Report, Maps, Fort McClellan, Anniston, Alabama* (ASR) indicates that Former Range 41 was built during the Vietnam War. The range was listed as a "Battle Drill & Assault Range." Range 41 was abandoned by 1974 (USACE, 2001a). Expended M-16 rifle blanks, smoke grenades, and 40mm target practice grenade cases were found on this range as indicated in the ASR.

Parcel 131Q-X is described as a former impact area within the Range 40 area. Parcel 131Q-X is 4.4 acres in size (ESE, 1998). No other information regarding site history or dates of use is known for Parcel 131Q-X.

Site walks by Shaw personnel conducted in December 2001 and January 2002 revealed that Former Range 41 appears to have been used for training. The most obvious feature noted during the site walk was a large "L"-shaped berm situated along the southwestern and western parcel boundaries (Figure 1-2). The berm was estimated to be 10 to 30 feet high. Two cleared areas were found at the western end of the parcel in front of the berm. In the open areas, vegetation consisted mostly of young longleaf pine. Bullet fragments, expended shell casings, and evidence of 40mm grenade firing were found in the cleared areas. South of the berm, in the southeast corner of Parcel 95Q, a small depression, a 55-gallon drum (used for small-arms target practice), and expended flares were noted. Within Parcel 131Q-X an observation tower was noted to the west of a dirt road. A small depression was observed to the west of the observation tower. On the east side of the road, a 3-foot-high berm was noted adjacent to a 4-foot-deep ditch. Building remnants with exposed electrical wiring were observed southeast of the parcels; it is possible that mechanical targets were controlled from this location. Areas south and west of the parcels showed evidence of having been recently logged.

1.3.1 Archives Search Report Ranges

Plate 6 of the ASR shows one range (OA-22 Range 41) overlapping the area of investigation (Figure 1-3). The location of Former Range 41 in the ASR differs slightly from the range location presented in the EBS because of spatial distortions associated with aerial photography. This is the only time period that Former Range 41 is shown on the plates in the ASR. The Impact Area is not noted on any of the ASR plates.

DRAFT. CHCK. BY:
ENGR. CHCK. BY: S. MORAN
INITIATOR: G. SISCO
PROJ. MGR.: J. YACOUB
STARTING DATE: 01/02/03
DRAWN BY: D. BOMAR
DATE LAST REV.:
DRAWN BY:
DWG. NO.: ...\796887es.648
PROJ. NO.: 796887
1/20/2004 8:36:10 AM
lstout
c:\cadd\Design\796887es.648

N

N 1,175,400

E 693,800

E 695,800

N 1,173,800

950
925
900
875
850
825
800
775
750

FLOW

FLOW

PARCEL 131Q-X
4.4 ACRES

PARCEL 95Q
8.0 ACRES

2
6
6
7
4
5
4
3
1
8

LEGEND

- UNIMPROVED ROADS AND PARKING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- TREES / TREELINE
- PARCEL BOUNDARY
- FIRING LINE
- SURFACE DRAINAGE / CREEK
- BERM

APPROXIMATE LOCATION OF OBSERVED FEATURES

1. DITCH AND BERM
2. IMPACT BERM / BACKSTOP
3. OBSERVATION TOWER
4. DEPRESSION
5. 55-GALLON DRUM AND EXPENDED FLARES
6. CLEARED AREA, NUMEROUS EXPENDED SHELL CASINGS AND 40mm TARGET GRENADE FRAGMENTS
7. 5-GALLON STEEL BUCKET
8. BUILDING REMNANTS

SCALE
0 200 400 FEET

FIGURE 1-2
SITE MAP
FORMER RANGE 41, PARCEL 95Q IMPACT AREA, CHOCCOLOCCO CORRIDOR, PARCEL 131Q-X

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

Shaw™ Shaw Environmental, Inc.

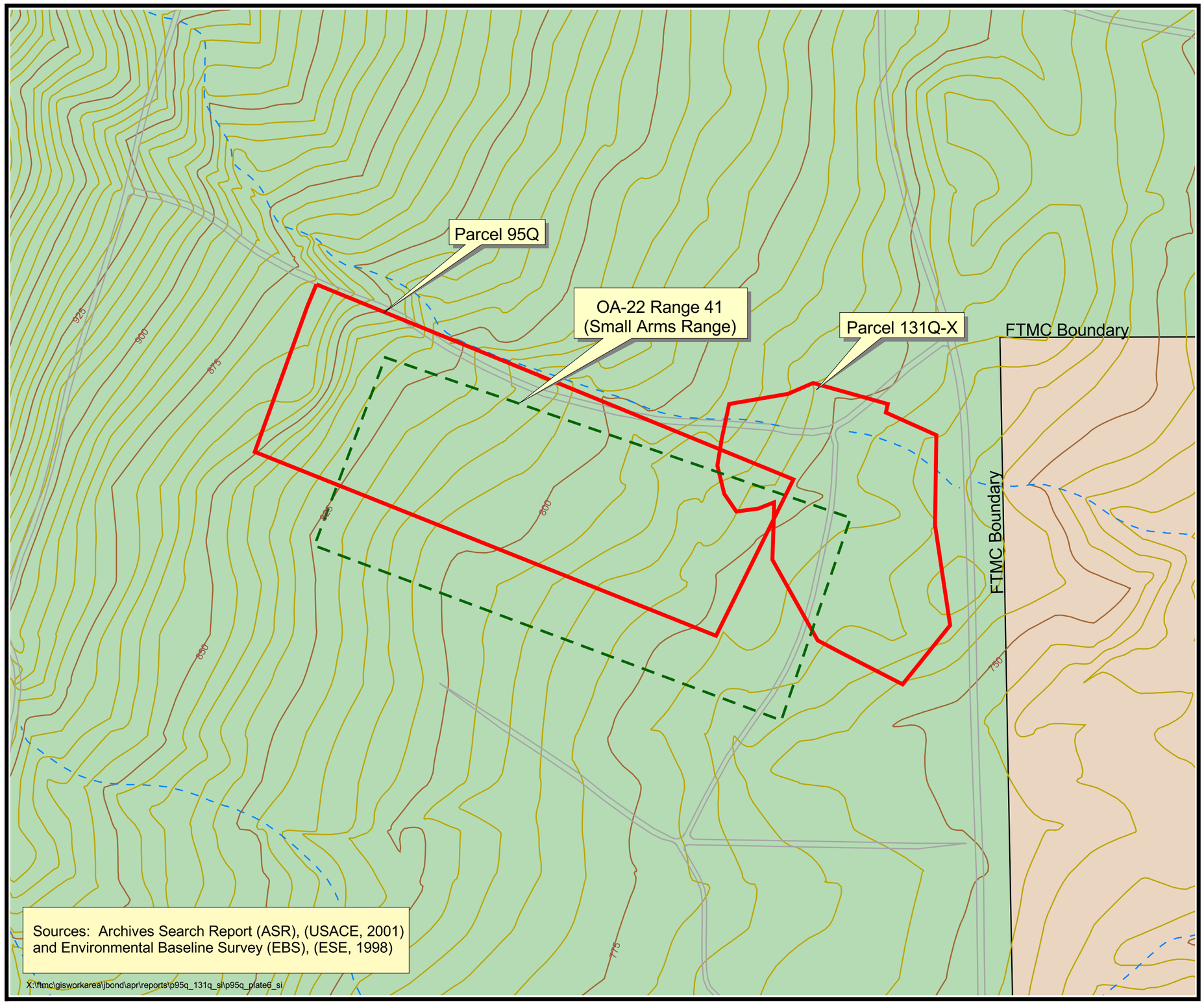


Figure 1-3

Range Location Map, ASR Plate 6

Former Range 41, Parcel 95Q and Impact Area, Choccolocco Corridor, Parcel 131Q-X Fort McClellan, Alabama

Legend

- EBS Parcel
- ASR Range
- Roads
- Streams (dashed where intermittent)
- Topographic Contours 5-foot Interval

200 0 200 Feet

NAD83 State Plane Coordinates

N

Shaw™ Shaw Environmental, Inc.

U.S. Army Corps of Engineers Mobile District

Contract No. DACA21-96-D-0018

1.3.2 Aerial Photographs

Available aerial photographs were reviewed to reveal any land-use activity in the area of investigation, as discussed in the following paragraphs.

1937 and 1940. The area of investigation is mostly forested; however, there is an area at the western corner of Former Range 41 that has been cleared. A large portion of the Impact Area is also cleared.

1954. The area of investigation is forested.

1969. The 1969 aerial photograph (Figure 1-4) shows that Former Range 41 has been cleared. A berm (noted during the December 2001 site walk) along the southwestern and western boundaries of the parcel is evident on the photograph, as are probable targets located in the central area of the range. A portion of the Impact Area is cleared, and a structure is evident in the approximate location of the observation tower noted during the site walk.

1976. Former Range 41 is predominantly cleared, although the eastern portion has some regrowth. The berm is visible. The part of the Impact Area that was cleared in the 1969 photograph is revegetating.

1982. Former Range 41 is partially wooded, and the Impact Area is almost completely wooded. Two areas within Former Range 41, near the western end and approximately halfway along the northern parcel boundary, are still cleared. The berm is still visible in the photograph.

1994. The 1994 aerial photograph (Figure 1-5) shows the Impact Area to be completely wooded. Former Range 41 appears unchanged from the 1982 aerial photograph. The berm remains visible.

1998. As shown on the 1998 aerial photograph (Figure 1-6), the Impact Area and Former Range 41 are essentially unchanged from the 1994 aerial photograph.

This map employs uncontrolled aerial photographs. The resulting distortions affect the spatial accuracy of the photographs.

X:\ftmc\gisworkarea\jbond\apr\reports\p95q_131q_si\p95q_1969_si

Figure 1-4

1969 Aerial Photograph

Former Range 41, Parcel 95Q and Impact Area, Choccolocco Corridor, Parcel 131Q-X
Fort McClellan, Alabama

Legend

Area of Investigation/ Parcel Boundary

200 0 200 Feet

NAD83 State Plane Coordinates

N

Shaw™ Shaw Environmental, Inc.

U.S. Army Corps of Engineers Mobile District

Contract No. DACA21-96-D-0018

Figure 1-5

1994 Aerial Photograph

Former Range 41, Parcel 95Q and Impact Area, Choccolocco Corridor, Parcel 131Q-X
Fort McClellan, Alabama

Legend

Area of Investigation/ Parcel Boundary

200 0 200 Feet

NAD83 State Plane Coordinates

N

Shaw™ Shaw Environmental, Inc.

U.S. Army Corps of Engineers Mobile District

Contract No. DACA21-96-D-0018

Figure 1-6

1998 Aerial Photograph

Former Range 41, Parcel 95Q and Impact Area, Choccolocco Corridor, Parcel 131Q-X
Fort McClellan, Alabama

Legend

Area of Investigation/ Parcel Boundary

200 0 200 Feet

NAD83 State Plane Coordinates

N

Shaw Environmental, Inc.

U.S. Army Corps of Engineers Mobile District

Contract No. DACA21-96-D-0018

2.0 Previous Investigations

An EBS was conducted by ESE to document current environmental conditions of all FTMC property (ESE, 1998). The purpose of the study was to identify sites that, based on available information, have no history of contamination and comply with DOD guidance for fast-track cleanup at closing installations. The EBS also provides a baseline picture of FTMC properties by identifying and categorizing the properties by seven criteria:

1. Areas where no storage, release, or disposal of hazardous substances or petroleum products has occurred (including no migration of these substances from adjacent areas).

2. Areas where only release or disposal of petroleum products has occurred.

3. Areas where release, disposal, and/or migration of hazardous substances has occurred, but at concentrations that do not require a removal or remedial response.

4. Areas where release, disposal, and/or migration of hazardous substances has occurred, and all removal or remedial actions to protect human health and the environment have been taken.

5. Areas where release, disposal, and/or migration of hazardous substances has occurred, and removal or remedial actions are underway, but all required remedial actions have not yet been taken.

6. Areas where release, disposal, and/or migration of hazardous substances has occurred, but required actions have not yet been implemented.

7. Areas that are not evaluated or require additional evaluation.

For non-CERCLA environmental or safety issues, the parcel label includes the following components: a unique non-CERCLA issue number; the letter "Q" designating the parcel as a Community Environmental Response Facilitation Act (CERFA) Category 1 Qualified parcel; and the code of the specific non-CERCLA issue(s) present (ESE, 1998). The non-CERCLA issue codes used are:

- A = Asbestos (in buildings)
- L = Lead-based paint (in buildings)
- P = Polychlorinated biphenyls
- R = Radon (in buildings)
- RD = Radionuclides/radiological issues

- X = UXO
- CWM = Chemical warfare material.

The EBS was conducted in accordance with CERFA protocols (Public Law 102-426) and DOD policy regarding contamination assessment. Record searches and reviews were performed on all reasonably available documents from FTMC, the Alabama Department of Environmental Management (ADEM), the U.S. Environmental Protection Agency (EPA) Region 4, and Calhoun County, as well as a database search of CERCLA-regulated substances, petroleum products, and Resource Conservation and Recovery Act-regulated facilities. Available historical maps and aerial photographs were reviewed to document historical land uses. Personal and telephone interviews of past and present FTMC employees and military personnel were conducted. In addition, visual site inspections were conducted to verify conditions of specific property parcels.

Parcels 95Q and 131Q-X are areas where no known or recorded storage, release, or disposal (including migration) of hazardous substances or petroleum products has occurred on site property. The parcels, however, were qualified because chemicals of potential concern and/or UXO may be present as a result of historical range activities. Therefore, these parcels required additional evaluation to determine their environmental condition.

3.0 Current Site Investigation Activities

This chapter summarizes SI activities conducted by Shaw at Former Range 41, Parcel 95Q, and Impact Area, Choccolocco Corridor, Parcel 131Q-X, including UXO avoidance activities, environmental sampling and analysis, and groundwater monitoring well installation activities.

3.1 UXO Avoidance

UXO avoidance was performed at Parcels 95Q and 131Q-X, following methodology outlined in the SAP. Shaw UXO personnel used a low-sensitivity magnetometer to perform a surface sweep of the area of investigation prior to site access. After the site was cleared for access, sample locations were monitored by UXO personnel following procedures outlined in the SAP.

3.2 Environmental Sampling

Environmental sampling performed during the SI at Parcels 95Q and 131Q-X included the collection of surface and depositional soil samples, subsurface soil samples, groundwater samples, surface water samples, and sediment samples for chemical analysis. Sample locations were determined by observing site physical characteristics during a site walk and by reviewing historical documents and aerial photographs pertaining to activities conducted at the site. The sample locations, media, and rationale are summarized in Table 3-1. Sampling locations are shown on Figure 3-1. Samples were submitted for laboratory analysis of site-related parameters listed in Section 3.4.

3.2.1 Surface and Depositional Soil Sampling

Surface soil samples were collected from 15 locations and depositional soil samples were collected from 3 locations at Parcels 95Q and 131Q-X, as shown on Figure 3-1. Soil sampling locations and rationale are presented in Table 3-1. Sample designations and analytical parameters are listed in Table 3-2. Soil sampling locations were determined in the field by the on-site geologist based on UXO avoidance activities, sampling rationale, presence of surface structures, and site topography.

Sample Collection. Surface soil samples were collected from the uppermost foot of soil using a stainless-steel hand auger, following the methodology specified in the SAP. Depositional soil samples were collected from the upper six inches of soil with a stainless-steel hand auger. Surface and depositional soil samples were collected by first removing surface debris (e.g., rocks and vegetation) from the immediate sample area. The soil sample was then collected with the

Table 3-1

Sampling Locations and Rationale
Former Range 41, Parcel 95Q, and Impact Area, Choccolocco Corridor, Parcel 131Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Media	Sample Location Rationale
HR-95Q-MW01	Surface soil, subsurface soil, and groundwater	Surface soil, subsurface soil, and groundwater samples were collected in the western portion of Parcel 95Q, downslope from the impact berm/backstop, to determine if potential site-specific chemicals have impacted site media.
HR-95Q-MW02	Surface soil, subsurface soil, and groundwater	Surface soil, subsurface soil, and groundwater samples were collected in the north-central area of Parcel 95Q, within a cleared area where expended shell casings and 40mm grenade fragments were observed, to determine if potential site-specific chemicals have impacted site media.
HR-95Q-MW03	Surface soil, subsurface soil, and groundwater	Surface soil, subsurface soil, and groundwater samples were collected in the eastern end of Parcel 95Q, in the firing line area, to determine if potential site-specific chemicals have impacted site media.
HR-95Q-GP01	Surface soil and subsurface soil	Surface and subsurface soil samples were collected on the impact berm/backstop at the western end of Parcel 95Q to determine if potential site-specific chemicals have impacted site media.
HR-95Q-GP02	Surface soil and subsurface soil	Surface and subsurface soil samples were collected on the impact berm/backstop at the western end of Parcel 95Q to determine if potential site-specific chemicals have impacted site media.
HR-95Q-GP03	Surface soil and subsurface soil	Surface and subsurface soil samples were collected on the impact berm/backstop at the western end of Parcel 95Q to determine if potential site-specific chemicals have impacted site media.
HR-95Q-GP04	Surface soil and subsurface soil	Surface and subsurface soil samples were collected in a cleared area downslope of the impact berm/backstop to determine if potential site-specific chemicals have impacted site media.
HR-95Q-GP05	Surface soil and subsurface soil	Surface and subsurface soil samples were collected adjacent to and downslope from the berm along the southern boundary of Parcel 95Q to determine if potential site-specific chemicals have impacted site media.
HR-95Q-GP06	Surface soil and subsurface soil	Surface and subsurface soil samples were collected downslope of a 55-gallon drum and depressions near the southeastern corner of Parcel 95Q to determine if potential site-specific chemicals have impacted site media.
HR-95Q-GP07	Surface soil and subsurface soil	Surface and subsurface soil samples were collected on the berm that extends along the southern boundary of the parcel to determine if potential site-specific chemicals have impacted site media.
HR-95Q-GP08	Surface soil and subsurface soil	Surface and subsurface soil samples were collected on the berm along the southern boundary of the parcel, near the southeastern corner of Parcel 95Q, to determine if potential site-specific chemicals have impacted site media.
HR-95Q-GP09	Surface soil and subsurface soil	Surface and subsurface soil samples were collected near the southeastern corner of Parcel 95Q, downslope of the southern end of the large berm, to determine if potential site-specific chemicals have impacted site media.

Table 3-1

Sampling Locations and Rationale
Former Range 41, Parcel 95Q, and Impact Area, Choccolocco Corridor, Parcel 131Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Media	Sample Location Rationale
HR-95Q-SW/SD01	Surface water and sediment	Surface water and sediment samples were collected from an intermittent upstream location northwest of the parcel to determine if potential site-specific chemicals have impacted site media.
HR-95Q-DEP01	Depositional soil	A depositional soil sample was collected from an erosional gully located at the eastern edge of the parcel, downslope of the target impact area, to determine if potential site-specific chemicals have impacted site media.
HR-95Q-DEP02	Depositional soil	A depositional soil sample was collected from an erosional gully located at the eastern edge of the parcel, downslope of the target impact area, to determine if potential site-specific chemicals have impacted site media.
HR-131Q-MW01	Surface soil, subsurface soil	Surface soil, subsurface soil, and groundwater samples were collected adjacent to a berm and ditch in the southern area of Parcel 131Q-X to determine if potential site-specific chemicals have impacted site media.
HR-131Q-GP01	Surface soil and subsurface soil	Surface and subsurface soil samples were collected downslope of the northern ends of the berm and ditch in the southern area of Parcel 131Q-X to determine if potential site-specific chemicals have impacted site media.
HR-131Q-GP02	Surface soil and subsurface soil	Surface and subsurface soil samples were collected adjacent to the southern end of the berm and ditch in the southern area of Parcel 131Q-X to determine if potential site-specific chemicals have impacted site media.
HR-131Q-SW/SD01	Surface water and sediment	Surface water and sediment samples were collected from the intermittent stream that flows through the northern portion of the Parcel 131Q-X to determine if potential site-specific chemicals have impacted site media.
HR-131Q-DEP01	Depositional soil	A depositional soil sample was collected southeast of Parcel 131Q-X, downslope of the parcel, to determine if potential site-specific chemicals have impacted site media.

Table 3-2

Soil Sample Designations and Analytical Parameters, Former Range 41, Parcel 95Q, and Impact Area, Choccolocco Corridor, Parcel 131Q-X Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples		Analytical Parameters
			Field Duplicates	MS/MSD	
HR-95Q-GP01	HR-95Q-GP01-SS-QW0001-REG	0-1	HR-95Q-GP01-SS-QW0002-FD	HR-95Q-GP01-SS-QW0001-MS/MSD	Metals, VOCs, SVOCs, Pesticides, Herbicides, and Explosives
	HR-95Q-GP01-DS-QW0003-REG	1-2			
HR-95Q-GP02	HR-95Q-GP02-SS-QW0004-REG	0-1			Metals and Explosives
	HR-95Q-GP02-DS-QW0005-REG	1-2			
HR-95Q-GP03	HR-95Q-GP03-SS-QW0006-REG	0-1			Metals and Explosives
	HR-95Q-GP03-DS-QW0007-REG	1-2			
HR-95Q-GP04	HR-95Q-GP04-SS-QW0008-REG	0-1			Metals and Explosives
	HR-95Q-GP04-DS-QW0009-REG	1-2			
HR-95Q-GP05	HR-95Q-GP05-SS-QW0010-REG	0-1			Metals and Explosives
	HR-95Q-GP05-DS-QW0011-REG	1-2			
HR-95Q-GP06	HR-95Q-GP06-SS-QW0012-REG	0-1			Metals and Explosives
	HR-95Q-GP06-DS-QW0013-REG	2-3			
HR-95Q-GP07	HR-95Q-GP07-SS-QW0022-REG	0-1			Metals and Explosives
	HR-95Q-GP07-DS-QW0023-REG	1-2			
HR-95Q-GP08	HR-95Q-GP08-SS-QW0024-REG	0-1			Metals and Explosives
	HR-95Q-GP08-DS-QW0025-REG	2-3			
HR-95Q-GP09	HR-95Q-GP09-SS-QW0026-REG	0-1			Metals and Explosives
	HR-95Q-GP09-DS-QW0027-REG	1.5-2.5			
HR-95Q-MW01	HR-95Q-MW01-SS-QW0014-REG	0-1			Metals and Explosives
	HR-95Q-MW01-DS-QW0015-REG	1-2			
HR-95Q-MW02	HR-95Q-MW02-SS-QW0016-REG	0-1			Metals and Explosives
	HR-95Q-MW02-DS-QW0017-REG	1-2			
HR-95Q-MW03	HR-95Q-MW03-SS-QW0018-REG	0-1			Metals and Explosives
	HR-95Q-MW03-DS-QW0019-REG	2-3			
HR-95Q-DEP01	HR-95Q-DEP01-DEP-QW0020-REG	0-0.5			Metals, VOCs, SVOCs, Pesticides, Herbicides, and Explosives
HR-95Q-DEP02	HR-95Q-DEP02-DEP-QW0021-REG	0-0.5			Metals and Explosives
HR-131Q-GP01	HR-131Q-GP01-SS-QY0001-REG	0-1			Metals and Explosives
	HR-131Q-GP01-DS-QY0002-REG	1-2			
HR-131Q-GP02	HR-131Q-GP02-SS-QY0003-REG	0-1			Metals and Explosives
	HR-131Q-GP02-DS-QY0004-REG	1-2			
HR-131Q-MW01	HR-131Q-MW01-SS-QY0005-REG	0-1			Metals and Explosives
	HR-131Q-MW01-DS-QY0006-REG	3-4	HR-131Q-MW01-DS-QY0007-FD	HR-131Q-MW01-DS-QY0006-MS/MSD	
HR-131Q-DEP01	HR-131Q-DEP01-DEP-QY0008-REG	0-0.5			Metals and Explosives

FD - Field duplicate.
MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance/quality control.
REG - Field sample.
SVOC - Semivolatile organic compound.
VOC - Volatile organic compound.

DRAFT. CHCK. BY:
ENGR. CHCK. BY: S. MORAN
INITIATOR: G. SISCO
PROJ. MGR.: J. YACOUB
DWG. NO.: ...\796887es.649
DATE LAST REV.:
DRAWN BY:
PROJ. NO.: 796887
STARTING DATE: 01/02/03
DRAWN BY: D. BOMAR
1/20/2004 8:39:08 AM
lstout c:\cadd\Design\796887es.649

N 1,175,400
E 693,800
E 695,800
N 1,173,800

HR-95Q-SW/SD01
HR-95Q-GP01
HR-95Q-GP02
HR-95Q-MW01
HR-95Q-MW02(SB)
HR-95Q-MW02(W)
HR-95Q-GP03
HR-95Q-GP04
HR-95Q-DEP01
HR-95Q-GP07
HR-95Q-MW03
HR-95Q-GP05
HR-95Q-GP08
HR-95Q-DEP02
HR-95Q-GP06
HR-95Q-GP09
HR-131Q-SW/SD01
HR-131Q-MW01 (WELL DRY)
HR-131Q-GP01
HR-131Q-GP02
HR-131Q-DEP01
A
A'
FLOW
FLOW
FIRING LINE
PARCEL 131Q-X
PARCEL 95Q
950
925
900
875
850
825
800
775
750

LEGEND

- UNIMPROVED ROADS AND PARKING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 25 FOOT)
- TREES / TREELINE
- PARCEL BOUNDARY
- FIRING LINE
- SURFACE DRAINAGE / CREEK
- BERM
- SURFACE WATER/SEDIMENT SAMPLE LOCATION
- SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- GROUNDWATER, SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- MONITORING WELL / SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- MONITORING WELL / GROUNDWATER SAMPLE LOCATION
- DEPOSITIONAL SOIL SAMPLE LOCATION
- (SB) SOIL BORING LOCATION
- (W) WELL LOCATION
- A A' CROSS SECTION LOCATION

APPROXIMATE LOCATION OF OBSERVED FEATURES

1. DITCH AND BERM
2. IMPACT BERM / BACKSTOP
3. OBSERVATION TOWER
4. DEPRESSION
5. 55-GALLON DRUM AND EXPENDED FLARES
6. CLEARED AREA, NUMEROUS EXPENDED SHELL CASINGS AND 40mm TARGET GRENADE FRAGMENTS
7. 5-GALLON STEEL BUCKET
8. BUILDING REMNANTS

SCALE
0 200 400 FEET

FIGURE 3-1
SAMPLE LOCATION MAP
FORMER RANGE 41, PARCEL 95Q
IMPACT AREA, CHOCCOLOCCO CORRIDOR, PARCEL 131Q-X

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

Shaw™ Shaw Environmental, Inc.

sampling device and was screened with a photoionization detector (PID) in accordance with procedures outlined in the SAP. As necessary, the soil fraction for volatile organic compound (VOC) analysis was collected directly from the sample device using three EnCore® samplers. The remaining soil was then transferred to a clean stainless-steel bowl, homogenized, and placed in the appropriate sample containers. Sample collection logs are included in Appendix A. The samples were analyzed for the parameters listed in Table 3-2 using methods outlined in Section 3.4.

3.2.2 Subsurface Soil Sampling

Subsurface soil samples were collected from 15 soil borings at Parcels 95Q and 131Q-X, as shown on Figure 3-1. Subsurface soil sampling locations and rationale are presented in Table 3-1. Sample designations, depths, and analytical parameters are listed in Table 3-2. Soil boring locations were determined in the field by the on-site geologist based on UXO avoidance activities, sampling rationale, presence of surface structures, and site topography.

Sample Collection. Subsurface soil samples were collected from soil borings at depths greater than one foot below ground surface (bgs) in the unsaturated zone. The soil borings were advanced and soil samples collected using a stainless-steel hand auger, following procedures specified in the SAP. Sample collection logs are included in Appendix A. The samples were analyzed for the parameters listed in Table 3-2 using methods outlined in Section 3.4.

Subsurface soil samples were collected continuously to 4 feet bgs or until hand-auger refusal was encountered. Samples were field screened using a PID to measure volatile organic vapors. The sample displaying the highest reading was selected and sent to the laboratory for analysis; however, at those locations where PID readings were below background, the deepest sample interval was submitted for analysis. As necessary, the soil fraction for VOC analysis was collected directly from the sample device using three EnCore samplers. The remaining soil was then transferred to a clean stainless-steel bowl, homogenized, and placed in the appropriate sample containers. The on-site geologist constructed a detailed boring log for each soil boring. The boring logs are included in Appendix B.

3.2.3 Monitoring Well Installation

Four permanent monitoring wells were installed at Parcels 95Q and 131Q-X to collect groundwater samples for laboratory analysis. However, one of the wells (HR-131Q-MW01) did not produce sufficient water for sampling. The well locations are shown on Figure 3-1.

Table 3-3 summarizes construction details of the monitoring wells installed at the site. The well construction logs are included in Appendix B.

Shaw contracted Miller Drilling Company to install the permanent wells using a hollow-stem auger rig at four of the hand-auger soil boring locations (HR-95Q-MW01, HR-95Q-MW02, HR-95Q-MW03, and HR-131Q-MW01). The wells were installed following procedures outlined in the SAP. The borehole at each well location was advanced with a 4.25-inch inside diameter (ID) hollow-stem auger from ground surface to the first groundwater-bearing zone in residuum at the well location. Beginning at the completion depth of the hand-auger boring, a 2-foot-long, 2-inch ID carbon steel split-spoon sampler was driven at 5-foot intervals to collect residuum for observing and describing lithology. The samples were logged to determine lithologic changes and the approximate depth of groundwater encountered during drilling. This information was used to determine the optimal placement of the monitoring well screen interval and to provide site-specific geological and hydrogeological information. Soil characteristics were described using the "Burmeister Identification System" described in Hunt (1986) and the Unified Soil Classification System as outlined in American Society for Testing and Materials (ASTM) Method D 2488 (ASTM, 2000). The boring logs are included in Appendix B.

Upon reaching the target depth in each borehole, a 10- to 30-foot length of 2-inch ID, 0.010-inch continuous slot, Schedule 40 polyvinyl chloride (PVC) screen with a PVC end cap was placed through the auger to the bottom of the borehole. The screen and end cap were attached to 2-inch ID, flush-threaded Schedule 40 PVC riser. A filter pack consisting of Number 1 filter sand (environmentally safe, clean fine sand, sieve size 20 to 40) was tremied around the well screen to approximately 5 feet above the top of the well screen as the augers were removed. At two well locations (HR-95Q-MW01 and HR-131Q-MW01), the filter pack also included an approximately 5-foot layer of extra fine filter sand (sieve size 30 to 70). A bentonite seal, consisting of approximately 5 feet of bentonite pellets, was placed immediately on top of the filter pack and hydrated with potable water. The bentonite seal placement and hydration followed procedures in the SAP. Bentonite-cement grout was tremied into the remaining annular space of the well from the top of the bentonite seal to ground surface. A locking protective steel casing was placed over the top of the PVC well casing, and a concrete pad was constructed around the wellhead.

The monitoring wells that produced water were developed by surging and pumping with a submersible pump in accordance with methodology outlined in the SAP. The submersible pump used for well development was moved in an up-and-down fashion to encourage any residual well

Table 3-3

Monitoring Well Construction Summary
Former Range 41, Parcel 95Q, and Impact Area, Choccolocco Corridor, Parcel 131Q-X
Fort McClellan, Calhoun County, Alabama

Well Location	Northing	Easting	Ground Elevation (ft amsl)	TOC Elevation (ft amsl)	Well Depth (ft bgs)	Screen Length (ft)	Screen Interval (ft bgs)	Well Material
HR-95Q-MW01	1174908.99	694174.91	838.16	840.20	60	30	29.7 - 59.7	2" ID Sch. 40 PVC
HR-95Q-MW02	1174848.83	694542.47	813.20	815.27	35	10	24.7 - 34.7	2" ID Sch. 40 PVC
HR-95Q-MW03	1174611.63	694957.65	783.86	785.74	45	20	24.7 - 44.7	2" ID Sch. 40 PVC
HR-131Q-MW01	1174412.67	695232.95	768.90	770.92	52	20	31.7 - 51.7	2" ID Sch. 40 PVC

Permanent wells installed using hollow-stem auger.
Horizontal coordinates referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum of 1983.
Elevations referenced to the North American Vertical Datum of 1988.
2" ID Sch. 40 PVC - 2-inch inside diameter, Schedule 40, polyvinyl chloride.
amsl - Above mean sea level.
bgs - Below ground surface.
ft - Feet.

installation materials to enter the well. These materials were then pumped out of the well to re-establish the natural hydraulic flow conditions. Development continued for 8 hours or until the well was pumped dry and allowed to recharge three successive times. The well development logs are included in Appendix C.

3.2.4 Water Level Measurements

The depth to groundwater was measured in the permanent wells at the site on October 18, 2002, following procedures outlined in the SAP. Depth to groundwater was measured with an electronic water-level meter. The meter probe and cable were cleaned before use at each well following decontamination methodology presented in the SAP. Measurements were referenced to the top of the PVC well casing, as summarized in Table 3-4.

3.2.5 Groundwater Sampling

Groundwater samples were collected from three of the four monitoring wells installed at Parcels 95Q and 131Q-X. Monitoring well HR-131Q-MW01 was not sampled because the well did not produce enough water. The well/groundwater sample locations are shown on Figure 3-1. The groundwater sampling locations and rationale are listed in Table 3-1. The groundwater sample designations and analytical parameters are listed in Table 3-5.

Sample Collection. The groundwater samples were collected using either a peristaltic pump or a bladder pump equipped with Teflon™ tubing, following procedures outlined in the SAP. Samples for VOC analysis (from monitoring well HR-95Q-MW02) were collected using the "tube evacuation" method described in the SAP. Groundwater was sampled after purging a minimum of three well volumes and after field parameters (temperature, pH, dissolved oxygen, specific conductivity, oxidation-reduction potential, and turbidity) stabilized. Field parameters were measured using a calibrated water-quality meter. Field parameter readings are summarized in Table 3-6. Sample collection logs are included in Appendix A. The samples were analyzed for the parameters listed in Table 3-5 using methods outlined in Section 3.4.

3.2.6 Surface Water Sampling

Two surface water samples were collected at Parcels 95Q and 131Q-X at the locations shown on Figure 3-1. The surface water sample locations and rationale are listed in Table 3-1. Sample designations and analytical parameters are listed in Table 3-7. The actual sampling locations were determined based on field observations.

Table 3-4

Groundwater Elevations
Former Range 41, Parcel 95Q, and Impact Area, Choccolocco Corridor, Parcel 131Q-X and Vicinity
Fort McClellan, Calhoun County, Alabama

Well Location	Date	Depth to Water (ft BTOC)	Top of Casing Elevation (ft amsl)	Ground Elevation (ft amsl)	Groundwater Elevation (ft amsl)
HR-95Q-MW01	18-Oct-02	29.45	840.20	838.16	810.75
HR-95Q-MW02	18-Oct-02	14.49	815.27	813.20	800.78
HR-95Q-MW03	18-Oct-02	19.91	785.74	783.86	765.83
HR-131Q-MW01	18-Oct-02	53.62	770.92	768.90	717.30
Wells at Adjacent Parcels					
HR-94Q-MW01	18-Oct-02	23.48	904.66	904.73	881.18
HR-94Q-MW02	18-Oct-02	16.37	793.11	791.11	776.74
HR-96Q-MW01	18-Oct-02	29.73	837.07	834.96	807.34
HR-144Q-MW01	18-Oct-02	NA	903.99	901.94	NA
HR-145Q-MW01	18-Oct-02	21.70	814.49	812.44	792.79
HR-145Q-MW02	18-Oct-02	10.96	764.11	761.98	753.15
HR-146Q-MW01	18-Oct-02	11.49	826.46	826.20	814.97
HR-146Q-MW02	18-Oct-02	23.69	828.17	825.86	804.48
HR-147Q-MW01	18-Oct-02	67.25	842.95	840.87	775.70
HR-147Q-MW02	18-Oct-02	29.36	804.02	801.93	774.66
HR-148Q-MW01	18-Oct-02	24.70	830.94	828.88	806.24

Elevations referenced to the North American Vertical Datum of 1988 (NAVD88).

amsl - Above mean sea level
BTOC - Below top of casing
ft - Feet
NA - Not available; well was dry.

Table 3-5

Groundwater Sample Designations and Analytical Parameters
Former Range 41, Parcel 95Q, and Impact Area, Choccolocco Corridor, Parcel 131Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	QA/QC Samples		Analytical Parameters
		Field Duplicates	MS/MSD	
HR-95Q-MW01	HR-95Q-MW01-GW-QW3001-REG			Metals and Explosives
HR-95Q-MW02	HR-95Q-MW02-GW-QW3002-REG	HR-95Q-MW02-GW-QW3003-FD	HR-95Q-MW02-GW-QW3002-MS/MSD	Metals, VOCs, SVOCs, Pesticides, Herbicides, and Explosives
HR-95Q-MW03	HR-95Q-MW03-GW-QW3004-REG			Metals and Explosives

FD - Field duplicate.
MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance/quality control.
REG - Field sample.
SVOC - Semivolatile organic compound.
VOC - Volatile organic compound.

Table 3-6

Groundwater and Surface Water Field Parameters
Former Range 41, Parcel 95Q, and Impact Area, Choccolocco Corridor, Parcel 131Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Date	Media	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	ORP (mV)	Temperature (°C)	Turbidity (NTU)	pH (SU)
HR-95Q-MW01	22-Aug-02	GW	0.040	8.73	211	32.4	119	5.48
HR-95Q-MW02	20-Aug-02	GW	0.022	6.42	280	22.8	3.9	4.88
HR-95Q-MW03	21-Aug-02	GW	0.023	9.39	210	20.0	3.1	5.34
HR-95Q-SW/SD01	18-Jul-02	SW	0.019	7.07	-2	22.9	1.3	5.83
HR-131Q-SW/SD01	18-Jul-02	SW	0.021	8.39	137	24.8	0.4	5.96

°C - Degrees Celsius.
GW - Groundwater.
mg/L - Milligrams per liter.
mS/cm - Millisiemens per centimeter.
mV - Millivolts.
NTU - Nephelometric turbidity units.
ORP - Oxidation-reduction potential.
SU - Standard units.
SW - Surface water.

Table 3-7

Surface Water and Sediment Sample Designations and Analytical Parameters
Former Range 41, Parcel 95Q, and Impact Area, Choccolocco Corridor, Parcel 131Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Matrix	QA/QC Samples		Analytical Parameters
			Field Duplicates	MS/MSD	
HR-95Q-SW/SD01	HR-95Q-SW/SD01-SW-QW2001-REG	SW			Metals, VOCs, SVOCs, Pesticides, Herbicides, Explosives, TOC[a], Grain size[a]
	HR-95Q-SW/SD01-SD-QW1001-REG	SD	HR-95Q-SW/SD01-SD-QW1002-REG	HR-95Q-SW/SD01-SD-QW1001-MS/MSD	
HR-131Q-SW/SD01	HR-131Q-SW/SD01-SW-QY2001-REG	SW			Metals, Explosives, TOC[a], and Grain size[a]
	HR-131Q-SW/SD01-SD-QY1001-REG	SD			

[a] Sediment sample only except MS/MSD.

FD - Field duplicate.
MS/MSD - Matrix spike/matrix spike duplicate.
NA - Not applicable.
QA/QC - Quality assurance/quality control.
REG - Field sample.
SD - Sediment.
SVOC - Semivolatile organic compound.
SW - Surface water.
TOC - Total organic carbon.
VOC - Volatile organic compound.

Sample Collection. The surface water samples were collected by dipping a stainless-steel pitcher in the water and pouring the water into the sample containers, following procedures in the SAP. The samples were collected after field parameters had been measured using a calibrated water quality meter. Surface water field parameters are summarized in Table 3-6. The sample collection logs are included in Appendix A. The samples were analyzed for the parameters listed in Table 3-7 using methods outlined in Section 3.4.

3.2.7 Sediment Sampling

Two sediment samples were collected at the same locations as the surface water samples, as shown on Figure 3-1. The sediment sample locations and rationale are presented in Table 3-1. Sample designations and analytical parameters are listed in Table 3-7. The actual sediment sample locations were determined based on field observations.

Sample Collection. The sediment samples were collected in accordance with procedures specified in the SAP. Sediments were collected with a stainless-steel hand auger and placed in a clean stainless-steel bowl. Samples for VOC analysis were immediately collected using three EnCore samplers. The remaining sample was then homogenized and placed in the appropriate sample containers. The sample collection logs are included in Appendix A. The sediment samples were analyzed for the parameters listed in Table 3-7 using methods outlined in Section 3.4.

3.3 Surveying of Sample Locations

Sample locations were surveyed using global positioning system and conventional civil survey techniques described in the SAP. Horizontal coordinates were referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum of 1983. Elevations were referenced to the North American Vertical Datum of 1988. Horizontal coordinates and elevations are included in Appendix D.

3.4 Analytical Program

Samples collected during the SI were analyzed for various chemical parameters based on potential site-specific chemicals and on EPA, ADEM, FTMC, and USACE requirements. Samples collected at Parcels 95Q and 131Q-X were analyzed for the following parameters using EPA SW-846 methods, including Update III methods where applicable:

- Target analyte list metals – EPA Methods 6010B/7470A/7471A
- Nitroaromatic/nitramine explosives – EPA Method 8330.

A minimum of ten percent of the samples were analyzed for the following additional parameters:

- Target compound list (TCL) VOCs – EPA Method 8260B
- TCL semivolatile organic compounds (SVOC) – EPA Method 8270C
- Chlorinated herbicides – EPA Method 8151A
- Chlorinated pesticides – EPA Method 8081A
- Organophosphorous pesticides – EPA Method 8141A.

In addition, the sediment samples were analyzed for total organic carbon (TOC) content (Walkley-Black Method) and grain size (ASTM Method D-422).

3.5 Sample Preservation, Packaging, and Shipping

Sample preservation, packaging, and shipping followed requirements specified in the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SI are listed in the SAP. Sample documentation and chain-of-custody records were completed as specified in the SAP.

Completed analysis request and chain-of-custody records (Appendix A) were included with each shipment of sample coolers to EMAX Laboratories, Inc. in Torrance, California.

3.6 Investigation-Derived Waste Management and Disposal

Investigation-derived waste (IDW) was managed and disposed as outlined in the SAP. The IDW generated during the SI at Parcels 95Q and 131Q-X was segregated as follows:

- Drill cuttings
- Purge water from well development, sampling activities, and decontamination fluids
- Spent well materials and personal protective equipment.

Solid IDW was staged on site in lined rolloff bins prior to waste characterization and final disposal. Solid IDW was characterized using toxicity characteristic leaching procedure analysis. Based on the results, drill cuttings, spent well materials, and personal protective equipment generated during the SI were disposed as nonhazardous waste at the Three Corners Landfill located in Piedmont, Alabama.

Liquid IDW was staged on site pending the results of waste characterization. Liquid IDW was characterized by VOC, SVOC, and metals analyses. Based on the analyses, liquid IDW was discharged as nonhazardous waste to the FTMC wastewater treatment plant on the Main Post.

3.7 Variances/Nonconformances

Three variances to the SFSP were recorded during completion of the SI at Parcels 95Q and 131Q-X. The variances did not alter the intent of the investigation or the sampling rationale presented in the SFSP. The variances are summarized in Table 3-8, and the variance reports are included in Appendix E.

No nonconformances to the SFSP were recorded during completion of the SI at Parcels 95Q and 131Q-X.

3.8 Data Quality

The field sample analytical data are presented in tabular form in Appendix F. The field samples were collected, documented, handled, analyzed, and reported in a manner consistent with the SI work plan, the FTMC SAP and quality assurance plan, and standard, accepted methods and procedures. Data were reported and evaluated in accordance with Corps of Engineers South Atlantic Savannah Level B criteria (USACE, 2001b) and the stipulated requirements for the generation of definitive data presented in the SAP. Chemical data were reported by the laboratory via hard-copy data packages using Contract Laboratory Program-like forms.

Data Validation. The reported analytical data were validated in accordance with EPA National Functional Guidelines by Level III criteria. The data validation results are summarized by parcel in quality assurance reports, which include the data validation summary reports (Appendix G). Selected results were qualified based on the implementation of accepted data validation procedures and practices. These qualified parameters are highlighted in the report. The validation-assigned qualifiers were added to the Shaw Environmental Management System database for tracking and reporting. The qualified data were used in comparisons to the SSSLs and ESVs. Rejected data (assigned an "R" qualifier) were not used in the comparisons to the SSSLs and ESVs. The data presented in this report, except where qualified, meet the principle data quality objective for this SI.

Table 3-8

Variances to the Site-Specific Field Sampling Plan
Former Range 41, Parcel 95Q, and Impact Area, Choccolocco Corridor, Parcel 131Q-X
Fort McClellan, Calhoun County, Alabama

Variance to the SFSP	Justification for Variance	Impact to Site Investigation
Sample location HR-95Q-MW03 was moved approximately 35 feet northeast of the location proposed in the SFSP.	The sample location was moved because hollow-stem auger refusal was encountered prior to reaching groundwater.	None. Moving the sample location and well allowed for collection of a groundwater sample.
Surface water and sediment samples were not collected at proposed location HR-131Q-SW/SD02. A depositional soil sample (HR-131Q-DEP01) was collected at this location.	Surface water and sediment samples were not collected because surface water was not present in the intermittent stream at the time of sample collection.	None. Data from the depositional soil sample were used to characterize the site.
A groundwater sample was not collected from monitoring well HR-131Q-MW01.	The well was installed at the depth of hollow-stem auger refusal (52 feet below ground surface). During drilling and subsequent sampling activities, groundwater was encountered at approximately 50 feet below ground surface. However, the well did not produce sufficient water for sampling.	Minimal. Primarily because of the prevalence of clay in the soil, impacts to groundwater at depths greater than 50 feet are unlikely. Furthermore, sample data from the other three wells installed at the site indicated no groundwater contamination.

SFSP - Site-specific field sampling plan.

4.0 Site Characterization

Subsurface investigations performed at Former Range 41, Parcel 95Q, and Impact Area, Choccolocco Corridor, Parcel 131Q-X, provided soil, geologic, and groundwater data used to characterize the geology and hydrogeology of the site.

4.1 Regional and Site Geology

4.1.1 Regional Geology

Calhoun County includes parts of two physiographic provinces: the Piedmont Upland Province and the Valley and Ridge Province. The Piedmont Upland Province occupies the extreme eastern and southeastern portions of the county and is characterized by metamorphosed sedimentary rocks. The generally accepted range in age of these metamorphics is Cambrian to Devonian.

The majority of Calhoun County, including the Main Post of FTMC, lies within the Appalachian fold-and-thrust structural belt (Valley and Ridge Province) where southeastward-dipping thrust faults with associated minor folding are the predominant structural features. The fold-and-thrust belt consists of Paleozoic sedimentary rocks that have been asymmetrically folded and thrust-faulted, with major structures and faults striking in a northeast-southwest direction.

Northwestward transport of the Paleozoic rock sequence along the thrust faults has resulted in the imbricate stacking of large slabs of rock referred to as thrust sheets. Within an individual thrust sheet, smaller faults may splay off the larger thrust fault, resulting in imbricate stacking of rock units within an individual thrust sheet (Osborne and Szabo, 1984). Geologic contacts in this region generally strike parallel to the faults, and repetition of lithologic units is common in vertical sequences. Geologic formations within the Valley and Ridge Province portion of Calhoun County have been mapped by Warman and Causey (1962), Osborne and Szabo (1984), and Moser and DeJarnette (1992) and vary in age from Lower Cambrian to Pennsylvanian.

The basal unit of the sedimentary sequence in Calhoun County is the Cambrian Chilhowee Group. The Chilhowee Group consists of the Cochran, Nichols, Wilson Ridge, and Weisner Formations (Osborne and Szabo, 1984), but in Calhoun County it is either undifferentiated or divided into the Cochran and Nichols Formations and an upper, undifferentiated Wilson Ridge and Weisner Formation. The Cochran is composed of poorly sorted arkosic sandstone and

conglomerate with interbeds of greenish gray siltstone and mudstone. Massive to laminated greenish gray and black mudstone makes up the Nichols Formation, with thin interbeds of siltstone and very fine-grained sandstone (Osborne et al., 1988). These two formations are mapped only in the eastern part of the county.

The Wilson Ridge and Weisner Formations are undifferentiated in Calhoun County and consist of both coarse-grained and fine-grained clastics. The coarse-grained facies appears to dominate the unit and consists primarily of coarse-grained, vitreous quartzite and friable, fine- to coarse-grained, orthoquartzitic sandstone, both of which locally contain conglomerate. The fine-grained facies consists of sandy and micaceous shale and silty, micaceous mudstone, which are locally interbedded with the coarse clastic rocks. The abundance of orthoquartzitic sandstone and quartzite suggests that most of the Chilhowee Group bedrock in the vicinity of FTMC belongs to the Weisner Formation (Osborne and Szabo, 1984).

The Cambrian Shady Dolomite overlies the Weisner Formation northeast, east, and southwest of the Main Post and consists of interlayered bluish gray or pale yellowish gray sandy dolomitic limestone and siliceous dolomite with coarsely crystalline, porous chert (Osborne et al., 1989). A variegated shale and clayey silt have been included within the lower part of the Shady Dolomite (Cloud, 1966). Material similar to this lower shale unit was noted in core holes drilled by the Alabama Geologic Survey on FTMC (Osborne and Szabo, 1984). The character of the Shady Dolomite in the FTMC vicinity and the true assignment of the shale at this stratigraphic interval are still uncertain (Osborne, 1999).

The Rome Formation overlies the Shady Dolomite and locally occurs to the northwest and southeast of the Main Post, as mapped by Warman and Causey (1962) and Osborne and Szabo (1984), and immediately to the west of Reilly Airfield (Osborne and Szabo, 1984). The Rome Formation consists of variegated, thinly interbedded grayish red-purple mudstone, shale, siltstone, and greenish red and light gray sandstone, with locally occurring limestone and dolomite. Weaver Cave, located approximately one mile west of the northwest boundary of the Main Post, is situated in gray dolomite and limestone mapped as the Rome Formation (Osborne et al., 1997). The Conasauga Formation overlies the Rome Formation and occurs along anticlinal axes in the northeastern portion of Pelham Range (Warman and Causey, 1962; Osborne and Szabo, 1984) and the northern portion of the Main Post (Osborne et al., 1997). The Conasauga Formation is composed of dark gray, finely to coarsely crystalline, medium- to thick-bedded dolomite with minor shale and chert (Osborne et al., 1989).

Overlying the Conasauga Formation is the Knox Group, which is composed of the Copper Ridge and Chepultepec dolomites of Cambro-Ordovician age. The Knox Group is undifferentiated in Calhoun County and consists of light medium gray, fine to medium crystalline, variably bedded to laminated, siliceous dolomite and dolomitic limestone that weather to a chert residuum (Osborne and Szabo, 1984). The Knox Group underlies a large portion of the Pelham Range area.

The Ordovician Newala and Little Oak Limestones overlie the Knox Group. The Newala Limestone consists of light to dark gray, micritic, thick-bedded limestone with minor dolomite. The Little Oak Limestone is comprised of dark gray, medium- to thick-bedded, fossiliferous, argillaceous to silty limestone with chert nodules. These limestone units are mapped as undifferentiated at FTMC and in other parts of Calhoun County. The Athens Shale overlies the Ordovician limestone units. The Athens Shale consists of dark gray to black shale and graptolitic shale with localized interbedded dark gray limestone (Osborne et al., 1989). These units occur within an eroded "window" in the uppermost structural thrust sheet at FTMC and underlie much of the developed area of the Main Post.

Other Ordovician-aged bedrock units mapped in Calhoun County include the Greensport Formation, Colvin Mountain Sandstone, and Sequatchie Formation. These units consist of various siltstones, sandstones, shales, dolomites, and limestones and are mapped as one, undifferentiated unit in some areas of Calhoun County. The only Silurian-age sedimentary formation mapped in Calhoun County is the Red Mountain Formation. This unit consists of interbedded red sandstone, siltstone, and shale with greenish gray to red silty and sandy limestone.

The Devonian Frog Mountain Sandstone consists of sandstone and quartzitic sandstone with shale interbeds, dolomudstone, and glauconitic limestone (Osborne, et al., 1988). This unit locally occurs in the western portion of Pelham Range.

The Mississippian Fort Payne Chert and the Maury Formation overlie the Frog Mountain Sandstone and are composed of dark to light gray limestone with abundant chert nodules and greenish gray to grayish red phosphatic shale, with increasing amounts of calcareous chert towards the upper portion of the formation (Osborne and Szabo, 1984). These units occur in the northwestern portion of Pelham Range. Overlying the Fort Payne Chert is the Floyd Shale, also of Mississippian age, which consists of thin-bedded, fissile brown to black shale with thin

intercalated limestone layers and interbedded sandstone. Osborne and Szabo (1984) reassigned the Floyd Shale, which was mapped by Warman and Causey (1962) on the Main Post of FTMC, to the Ordovician Athens Shale based on fossil data.

The Pennsylvanian Parkwood Formation overlies the Floyd Shale and consists of a medium to dark gray, silty clay, shale, and mudstone with interbedded light to medium gray, very fine to fine grained, argillaceous, micaceous sandstone. Locally the Parkwood Formation also contains beds of medium to dark gray, argillaceous, bioclastic to cherty limestone and beds of clayey coal up to a few inches thick (Raymond et al., 1988). The Parkwood Formation in Calhoun County is generally found within a structurally complex area known as the Coosa deformed belt. In the deformed belt, the Parkwood Formation and Floyd Shale are mapped as undifferentiated because their lithologic similarity and significant deformation make it impractical to map the contact (Thomas and Drahovzal, 1974; Osborne et al., 1988). The undifferentiated Parkwood Formation and Floyd Shale are found throughout the western quarter of Pelham Range.

The Jacksonville thrust fault is the most significant structural geological feature in the vicinity of the Main Post of FTMC, both for its role in determining the stratigraphic relationships in the area and for its contribution to regional water supplies. The trace of the fault extends northeastward for approximately 39 miles between Bynum, Alabama, and Piedmont, Alabama. The fault is interpreted as a major splay of the Pell City fault (Osborne and Szabo, 1984). The Ordovician sequence that makes up the Eden thrust sheet is exposed at FTMC through an eroded window, or fenster, in the overlying thrust sheet. Rocks within the window display complex folding, with the folds being overturned and tight to isoclinal. The carbonates and shales locally exhibit well-developed cleavage (Osborne and Szabo, 1984). The FTMC window is framed on the northwest by the Rome Formation; north by the Conasauga Formation; northeast, east, and southwest by the Shady Dolomite; and southeast and southwest by the Chilhowee Group (Osborne et al., 1997). Two small klippen of the Shady Dolomite, bounded by the Jacksonville fault, have been recognized adjacent to the Pell City fault at the FTMC window (Osborne et al., 1997).

The Pell City fault serves as a fault contact between the bedrock within the FTMC window and the Rome and Conasauga Formations. The trace of the Pell City fault is also exposed approximately nine miles west of the FTMC window on Pelham Range, where it traverses northeast to southwest across the western quarter of Pelham Range. Here, the trace of the Pell City fault marks the boundary between the Pell City thrust sheet and the Coosa deformed belt.

The eastern three-quarters of Pelham Range is located within the Pell City thrust sheet, while the remaining western quarter of Pelham Range is located within the Coosa deformed belt. The Pell City thrust sheet is a large-scale thrust sheet containing Cambrian and Ordovician rocks and is relatively less structurally complex than the Coosa deformed belt (Thomas and Neathery, 1982). The Pell City thrust sheet is exposed between the traces of the Jacksonville and Pell City faults along the western boundary of the FTMC window and along the trace of the Pell City fault on Pelham Range (Thomas and Neathery, 1982; Osborne et al., 1988). The Coosa deformed belt is a narrow northeast-to-southwest-trending linear zone of complex structure (approximately 5 to 20 miles wide and approximately 90 miles in length) consisting mainly of thin imbricate thrust slices. The structure within these imbricate thrust slices is often internally complicated by small-scale folding and additional thrust faults (Thomas and Drahovzal, 1974).

4.1.2 Site Geology

The soils at Former Range 41, Parcel 95Q and Impact Area, Choccolocco Corridor, Parcel 131Q-X, consist of Anniston and Allen gravelly loams; Jefferson gravelly fine sandy loam; and Philo and Stendal soils, local alluvium (U.S. Department of Agriculture [USDA], 1961).

The Anniston and Allen gravelly loam consists of deep, strongly acid, well drained soils that have developed in old alluvium. The parent material washed from adjacent, higher lying soils, which developed from weathered sandstone, shale and quartzite. The surface horizon of the Anniston and Allen gravelly loam is very dark to dark grayish-brown fine sandy loam or loam. The subsoil is dark-red fine sandy clay loam. Fragments of sandstone and quartzite are found on the surface and throughout the soil. They are found on foot slopes and colluvial fans (USDA, 1961).

The Jefferson gravelly fine sandy loam soil consists of well-drained, strongly acidic soils that occur in small areas on fans and foot slopes. These soils have developed from old local alluvium that washed or sloughed from ridges of sandstone, shale, and Weisner quartzite. The surface soil is dark grayish-brown fine sandy loam, and the subsoil is yellowish-brown, light fine sandy clay. Fragments of sandstone and quartzite are found on the surface and throughout the soil (USDA, 1961).

The Philo and Stendal soils, local alluvium occurs in areas 1 to 10 acres in size on footslopes, and along and at the heads of small drainageways. The soils are variable in color, texture, and consistency, but generally the surface soils are dark grayish-brown to dark-brown fine sandy

loam; and the subsoil is dark-brown, slightly mottled fine sandy loam. The parent material washed mainly from sandstone and shale, but some originated from limestone. The drainage ranges from somewhat poor to moderately good (USDA, 1961).

Bedrock wells were not installed at Parcels 95Q and 131Q-X, though the bedrock beneath the site is mapped as Shady Dolomite in the northwest and Rome Formation in the rest of the area of investigation. The Shady Dolomite is typically bluish gray thick bedded, medium crystalline limestone with a local unit of silty clay and clayey siltstone at the base (Raymond et al., 1988). The Shady Dolomite is overlain by the Rome Formation. The Rome Formation consists of variegated thinly interbedded grayish-red-purple mudstone, shale, siltstone, and greenish-red and light gray sandstone, with locally occurring limestone and dolomite (Raymond et al., 1988).

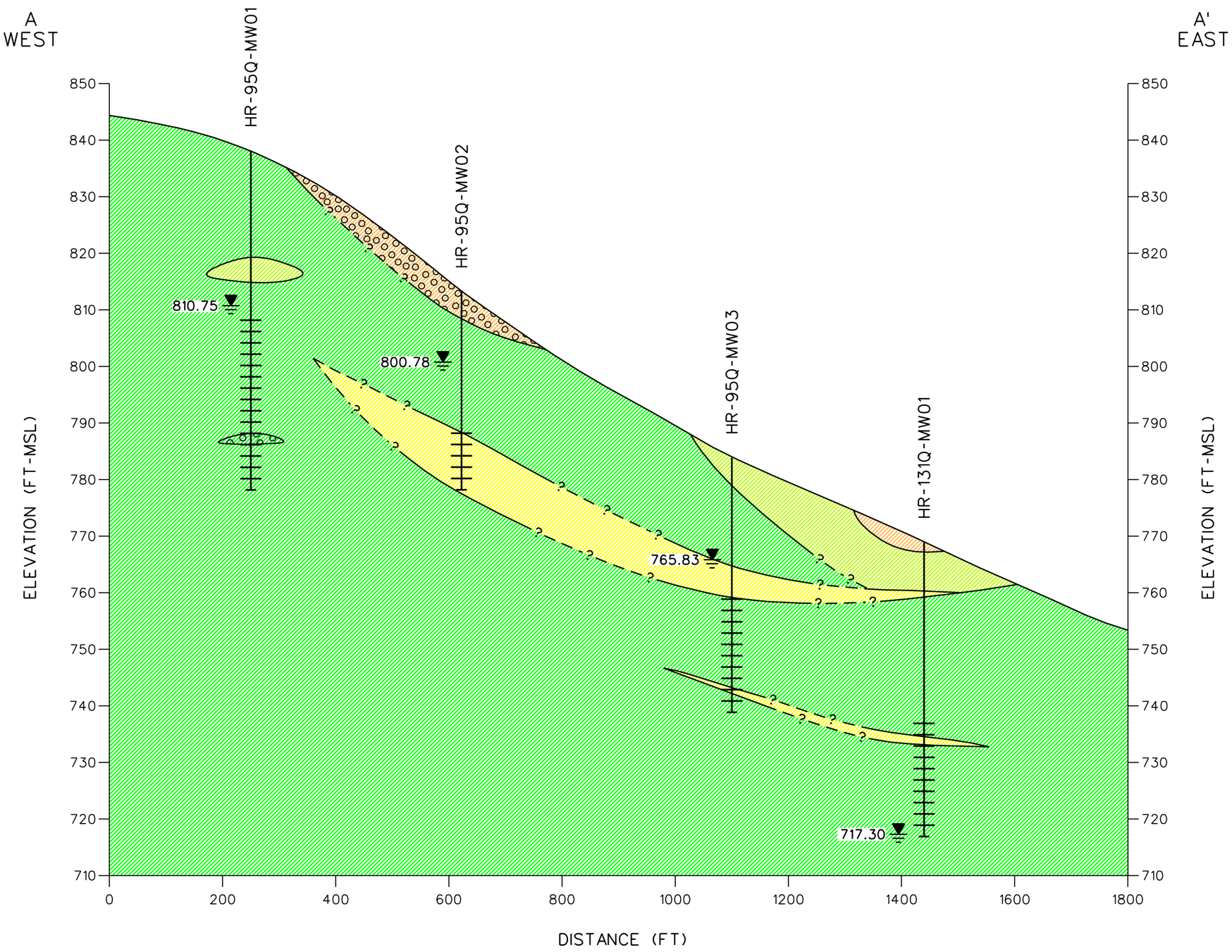
A geologic cross-section was constructed from the hollow-stem auger boring data, as shown on Figure 4-1. The geologic cross section location is shown on Figure 3-1. The residuum encountered during drilling activities at Parcels 95Q and 131Q-X consisted of light brown clay with some sand and little silt and sandstone gravel, and reddish brown clay and silt with little sand and sandstone gravel. Hollow-stem auger refusal was encountered at only one location, HR-131Q-MW01, at a depth of 52 feet bgs. Residuum encountered prior to refusal was described as brown clay with some gray siltstone gravel and little sand.

4.2 Site Hydrology

4.2.1 Surface Hydrology

Precipitation in the form of rainfall averages about 53 inches annually in Anniston, Alabama, with infiltration rates annually exceeding evapotranspiration rates (U.S. Department of Commerce, 1998). The major surface water feature in the Choccolocco Corridor is Choccolocco Creek, which flows south though the central portion of the corridor. Choccolocco Creek and its tributaries drain all of Choccolocco Corridor and ultimately empty into the Coosa River.

Ground elevation within the area of investigation at Parcels 95Q and 131Q-X ranges from approximately 755 to 865 feet above mean sea level. Surface water runoff in the area of investigation drains generally to the northern and central parts of the area into intermittent streams that flow to the east.



LEGEND

- SCREEN INTERVAL
- WATER TABLE (OCTOBER 18, 2002)
- 810.75 GROUNDWATER ELEVATION (FT MSL)
- CONTACT DASHED WHERE INFERRED
- SAND AND CLAY, SOME SILT
- SILT, SOME CLAY, LITTLE SAND
- GRAVEL, SILT, AND SAND, SOME CLAY
- GRAVEL AND CLAY
- CLAY, SOME SILT, LITTLE SAND
- CLAY AND SILT, LITTLE SAND

NOTES:

1. ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988.
2. DASHED WHERE INFERRED.
3. SEE FIGURE 3-1 FOR CROSS SECTION LOCATION.

HORIZONTAL
0 200 400 FEET

VERTICAL
0 20 40 FEET

FIGURE 4-1
GEOLOGIC CROSS SECTION A-A'
FORMER RANGE 41, PARCEL 95Q
IMPACT AREA, CHOCCOLOCCO
CORRIDOR, PARCEL 131Q-X

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

Shaw™ Shaw Environmental, Inc.

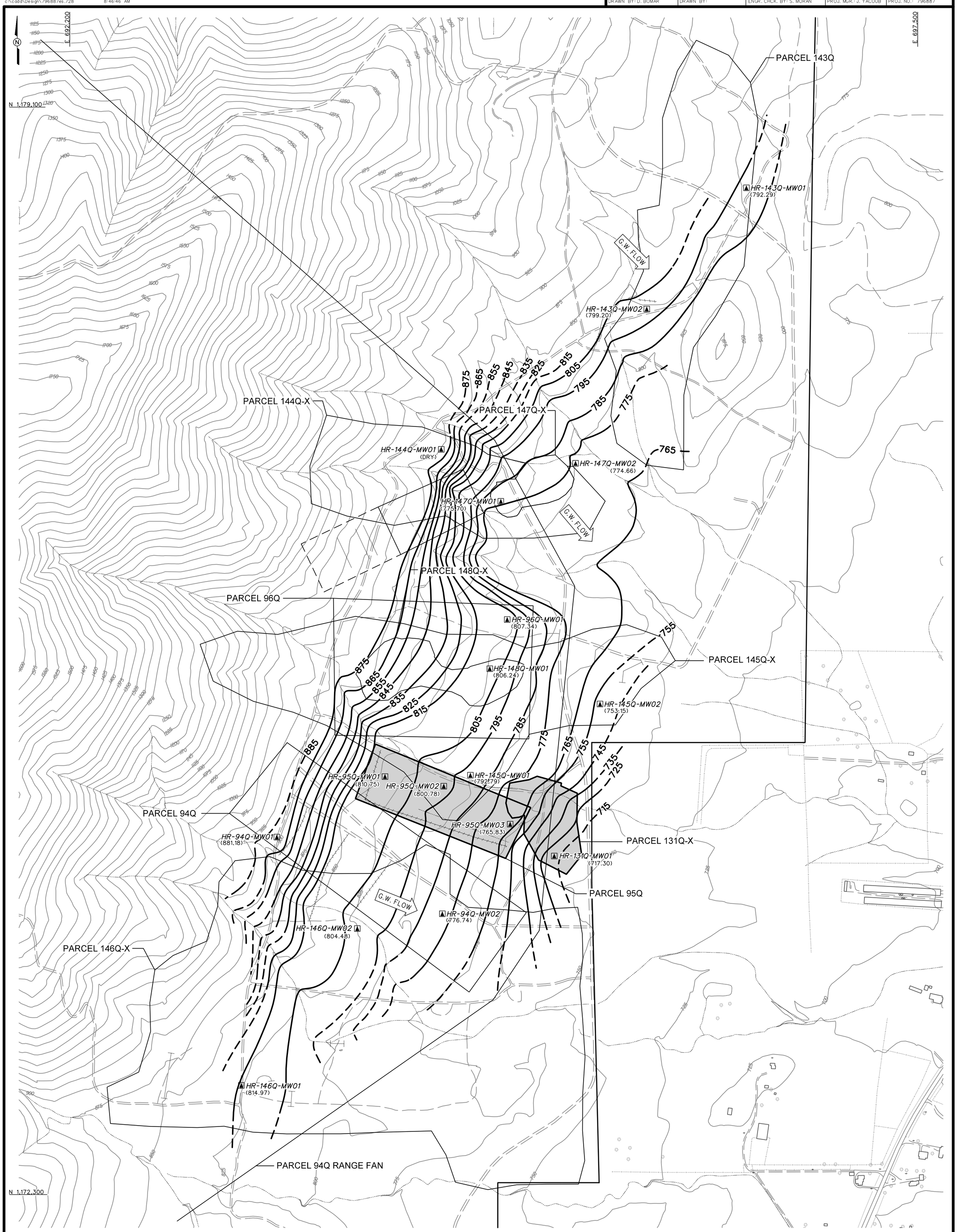
DRAFT. CHCK. BY:
ENGR. CHCK. BY: S. MORAN
INITIATOR: C. LEVAAS
PROJ. MGR.: J. YACOUB
DWG. NO.: ...\796887es.686
PROJ. NO.: 796887
DATE LAST REV.:
DRAWN BY:
STARTING DATE: 02/27/03
DRAWN BY: D. BOMAR
1/20/2004 8:42:03 AM
lstout
c:\cadd\Design\796887es.686

4.2.2 Hydrogeology

Static groundwater levels were measured in monitoring wells at Parcels 95Q and 131Q-X on October 18, 2002, as summarized in Table 3-4. Groundwater elevations were calculated by measuring the depth to groundwater relative to the surveyed top-of-casing elevations. A groundwater flow map was constructed using the October 18, 2002 data, as shown on Figure 4-2. As shown on the map, groundwater flow follows topography to the east and out of the ranges.

lstout 1/20/2004
c:\cadd\Design\796887es.728 8:46:46 AM

STARTING DATE: 04/14/03	DATE LAST REV.:	DRAFT. CHCK. BY:	INITIATOR: C. LEVAAS	DWG. NO.\796887es.728
DRAWN BY: D. BOMAR	DRAWN BY:	ENGR. CHCK. BY: S. MORAN	PROJ. MGR.: J. YACOUB	PROJ. NO.: 796887



LEGEND:

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 25 FOOT)
- GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)
- (755.71) GROUNDWATER ELEVATION (FT MSL) (OCTOBER 18, 2002)
- G.W. FLOW GROUNDWATER FLOW DIRECTION
- TREES / TREELINE
- PARCEL BOUNDARY
- INVESTIGATED BOUNDARY
- SURFACE DRAINAGE / CREEK
- TRENCH
- BERM
- FENCE
- MONITORING WELL / GROUNDWATER, SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION

SCALE
0 300 600 FEET

FIGURE 4-2
GROUNDWATER ELEVATION MAP
CHOCCOLOCCO RANGES,
CHOCCOLOCCO CORRIDOR

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

Shaw™ Shaw Environmental, Inc.

5.0 Summary of Analytical Results

The results of the chemical analysis of samples collected at Former Range 41, Parcel 95Q, and Impact Area, Choccolocco Corridor, Parcel 131Q-X, indicate that metals, VOCs, one pesticide, and one explosive compound were detected in site media. SVOCs and herbicides were not detected in any of the samples. To evaluate whether the detected constituents present an unacceptable risk to human health and the environment, the analytical results were compared to the human health SSSLs and ESVs for FTMC. The SSSLs and ESVs were developed for human health and ecological risk evaluations as part of the ongoing SIs being performed under the BRAC Environmental Restoration Program at FTMC.

Metals concentrations exceeding the SSSLs and ESVs were subsequently compared to metals background screening values to determine if the metals concentrations are within natural background concentrations (Science Applications International Corporation, 1998).

The following sections and Tables 5-1 through 5-5 summarize the results of the comparison of detected constituent concentrations to the SSSLs, ESVs, and background screening values. Complete analytical results are presented in Appendix F.

5.1 Surface and Depositional Soil Analytical Results

Fifteen surface soil samples and three depositional soil samples were collected for chemical analysis at Parcels 95Q and 131Q-X. Surface soil samples were collected from the uppermost foot of soil, and depositional soil samples were collected from the upper six inches of soil at the locations shown on Figure 3-1. Analytical results were compared to residential human health SSSLs, ESVs, and metals background screening values, as presented in Table 5-1.

Metals. A total of 22 metals were detected in the surface and depositional soil samples. The concentrations of nine metals (aluminum, antimony, arsenic, chromium, copper, iron, lead, manganese, and thallium) exceeded their respective SSSLs. Of these, the following six metals also exceeded their respective background values:

- Aluminum (18,100 to 29,800 mg/kg) exceeded its SSSL (7,803 mg/kg) and background (16,306 mg/kg) at seven sample locations.
- Antimony (4.3 to 4.78 milligrams per kilogram [mg/kg]) exceeded its SSSL (3.11 mg/kg) and background (1.99 mg/kg) at three sample locations (HR-95Q-GP03, HR-

Table 5-1

Surface and Depositional Soil Analytical Results
Former Range 41, Parcel 95Q, and Impact Area, Choccolocco Corridor, Parcel 131Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location					HR-131Q-DEP01					HR-131Q-GP01					HR-131Q-GP02				
Sample Number					QY0008					QY0001					QY0003				
Sample Date					18-Jul-02					13-Aug-02					13-Aug-02				
Sample Depth (Feet)					0- 0.5					0- 1					0- 1				
Parameter	Units	BKG[a]	SSSL[b]	ESV[b]	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	1.31E+04			YES	YES	1.23E+04			YES	YES	1.18E+04			YES	YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					ND					ND				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	3.73E+00			YES		3.54E+00			YES		4.49E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	5.59E+01					3.20E+02		YES		YES	1.04E+02				
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	4.51E-01	J				1.01E+00	J	YES			4.76E-01	J			
Calcium	mg/kg	1.72E+03	NA	NA	1.25E+02					1.20E+03					5.50E+02				
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	1.27E+01				YES	1.33E+01				YES	1.74E+01				YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	4.54E+00					8.66E+00					7.21E+00				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	1.61E+01		YES			1.22E+01					1.93E+01		YES		
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	1.60E+04			YES	YES	1.29E+04			YES	YES	2.17E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	1.26E+01					6.50E+01		YES		YES	1.90E+02		YES		YES
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	4.57E+02					5.31E+02					4.01E+02				
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	2.94E+02				YES	2.21E+03	J	YES	YES	YES	1.40E+03	J		YES	YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	4.68E-02	J				7.64E-02	J				6.14E-02	J			
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	5.67E+00					7.91E+00					6.00E+00				
Potassium	mg/kg	8.00E+02	NA	NA	1.04E+03		YES			5.73E+02					5.83E+02				
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	8.08E-01	J	YES			8.47E-01	J	YES		YES	1.08E+00		YES		YES
Silver	mg/kg	3.60E-01	3.91E+01	2.00E+00	ND					ND					ND				
Sodium	mg/kg	6.34E+02	NA	NA	ND					2.82E+01	J				2.29E+01	J			
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					ND					7.27E-01	J		YES	
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	1.88E+01				YES	1.60E+01				YES	2.40E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	1.66E+01					3.08E+01	J				1.85E+01	J			
VOLATILE ORGANIC COMPOUNDS																			
Acetone	mg/kg	NA	7.76E+02	2.50E+00	NR					NR					NR				
Trichlorofluoromethane	mg/kg	NA	2.33E+03	1.00E-01	NR					NR					NR				

Table 5-1

Surface and Depositional Soil Analytical Results
Former Range 41, Parcel 95Q, and Impact Area, Choccolocco Corridor, Parcel 131Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location					HR-131Q-MW01					HR-95Q-DEP01					HR-95Q-DEP02				
Sample Number					QY0005					QW0020					QW0021				
Sample Date					13-Aug-02					18-Jul-02					17-Jul-02				
Sample Depth (Feet)					0- 1					0- 0.5					0- 0.5				
Parameter	Units	BKG[a]	SSSL[b]	ESV[b]	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	1.13E+04			YES	YES	2.31E+04	J	YES	YES	YES	1.48E+04	J		YES	YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					ND					ND				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	3.12E+00			YES		9.83E+00			YES		6.83E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	1.39E+02		YES			4.62E+01					3.75E+01				
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	8.45E-01	J	YES			5.44E-01	J				5.15E-01	J			
Calcium	mg/kg	1.72E+03	NA	NA	9.35E+02					1.20E+02					1.14E+02				
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	1.27E+01				YES	2.75E+01			YES	YES	2.36E+01			YES	YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	5.93E+00					3.61E+00					7.38E+00				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	6.97E+00					7.53E+01		YES		YES	6.22E+01		YES		YES
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	1.25E+04			YES	YES	4.07E+04		YES	YES	YES	3.16E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	1.46E+01					1.87E+02	J	YES		YES	1.84E+02	J	YES		YES
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	5.04E+02					4.41E+02					2.92E+02				
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	8.90E+02	J		YES	YES	3.29E+02	J			YES	4.58E+02	J		YES	YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	5.73E-02	J				6.99E-02	J				5.72E-02	J			
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	8.24E+00					7.47E+00					6.74E+00				
Potassium	mg/kg	8.00E+02	NA	NA	6.27E+02					6.43E+02					4.58E+02	J			
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	5.66E-01	J	YES			1.63E+00		YES		YES	8.51E-01	J	YES		YES
Silver	mg/kg	3.60E-01	3.91E+01	2.00E+00	ND					1.51E+00	J	YES			1.11E+00	J	YES		
Sodium	mg/kg	6.34E+02	NA	NA	3.05E+01	J				ND					ND				
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					1.82E+00	B		YES	YES	9.19E-01	B		YES	
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	1.65E+01				YES	4.89E+01				YES	3.39E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	2.67E+01	J				2.67E+01	J				2.45E+01	J			
VOLATILE ORGANIC COMPOUNDS																			
Acetone	mg/kg	NA	7.76E+02	2.50E+00	NR					6.00E-02	J				NR				
Trichlorofluoromethane	mg/kg	NA	2.33E+03	1.00E-01	NR					4.30E-03	B				NR				

Table 5-1

Surface and Depositional Soil Analytical Results
Former Range 41, Parcel 95Q, and Impact Area, Choccolocco Corridor, Parcel 131Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location					HR-95Q-GP01					HR-95Q-GP02					HR-95Q-GP03				
Sample Number					QW0001					QW0004					QW0006				
Sample Date					12-Aug-02					12-Aug-02					12-Aug-02				
Sample Depth (Feet)					0- 1					0- 1					0- 1				
Parameter	Units	BKG[a]	SSSL[b]	ESV[b]	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	2.24E+04		YES	YES	YES	2.09E+04		YES	YES	YES	2.98E+04		YES	YES	YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					ND					4.47E+00	J	YES	YES	YES
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	7.00E+00	J		YES		7.39E+00	J		YES		8.37E+00	J		YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	5.00E+01					4.13E+01					7.57E+01				
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	4.85E-01	J				ND					5.93E-01	J			
Calcium	mg/kg	1.72E+03	NA	NA	6.74E+01	J				5.61E+01	J				1.77E+02				
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	2.17E+01				YES	2.20E+01				YES	2.40E+01			YES	YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	4.28E+00					2.07E+00	J				9.47E+00				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	1.40E+01		YES			1.32E+01		YES			1.37E+01		YES		
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	3.48E+04		YES	YES	YES	3.81E+04		YES	YES	YES	3.51E+04		YES	YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	1.55E+01					1.42E+01					1.83E+01				
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	4.58E+02					3.37E+02					6.67E+02				
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	3.27E+02	J			YES	1.50E+02	J			YES	7.60E+02	J		YES	YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	1.33E-01		YES		YES	1.58E-01		YES		YES	1.42E-01		YES		YES
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	7.24E+00					6.24E+00					1.12E+01		YES		
Potassium	mg/kg	8.00E+02	NA	NA	4.37E+02	J				4.51E+02	J				6.87E+02				
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	1.49E+00	J	YES		YES	1.33E+00	J	YES		YES	2.02E+00	J	YES		YES
Silver	mg/kg	3.60E-01	3.91E+01	2.00E+00	ND					ND					ND				
Sodium	mg/kg	6.34E+02	NA	NA	ND					ND					2.60E+01	J			
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					ND					ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	4.08E+01				YES	4.60E+01				YES	4.52E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	1.97E+01	J				1.42E+01	J				2.67E+01	J			
VOLATILE ORGANIC COMPOUNDS																			
Acetone	mg/kg	NA	7.76E+02	2.50E+00	3.20E-02	B				NR					NR				
Trichlorofluoromethane	mg/kg	NA	2.33E+03	1.00E-01	3.10E-03	B				NR					NR				

Table 5-1

Surface and Depositional Soil Analytical Results
Former Range 41, Parcel 95Q, and Impact Area, Choccolocco Corridor, Parcel 131Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location					HR-95Q-GP04					HR-95Q-GP05					HR-95Q-GP06				
Sample Number					QW0008					QW0010					QW0012				
Sample Date					12-Aug-02					13-Aug-02					12-Aug-02				
Sample Depth (Feet)					0- 1					0- 1					0- 1				
Parameter	Units	BKG[a]	SSSL[b]	ESV[b]	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	1.44E+04			YES	YES	2.95E+04		YES	YES	YES	1.31E+04			YES	YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					ND					ND				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	3.95E+00			YES		7.56E+00			YES		3.95E+00	J		YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	6.50E+01					1.06E+02					1.59E+02		YES		
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	5.04E-01	J				7.35E-01	J				8.19E-01	J	YES		
Calcium	mg/kg	1.72E+03	NA	NA	5.35E+01	J				3.89E+02					4.42E+02				
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	1.66E+01				YES	3.10E+01			YES	YES	8.62E+00				YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	3.54E+00					1.08E+01					8.36E+00				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	1.82E+02		YES		YES	7.67E+01		YES		YES	7.48E+00				
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	2.94E+04			YES	YES	3.52E+04		YES	YES	YES	1.18E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	5.08E+02		YES	YES	YES	2.01E+02		YES		YES	2.23E+01				
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	3.08E+02					8.02E+02					5.96E+02				
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	3.20E+02				YES	1.75E+03		YES	YES	YES	1.31E+03	J		YES	YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	4.53E-02	J				1.14E-01		YES		YES	6.89E-02	J			
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	6.79E+00					1.27E+01		YES			7.13E+00				
Potassium	mg/kg	8.00E+02	NA	NA	6.46E+02					8.56E+02		YES			5.80E+02				
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	9.60E-01	B	YES		YES	1.65E+00		YES		YES	1.01E+00	J	YES		YES
Silver	mg/kg	3.60E-01	3.91E+01	2.00E+00	ND					ND					ND				
Sodium	mg/kg	6.34E+02	NA	NA	2.59E+01	J				3.23E+01	J				2.66E+01	J			
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					9.69E-01	J		YES		ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	2.58E+01				YES	4.45E+01				YES	1.55E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	2.71E+01					4.10E+01		YES			1.91E+01	J			
VOLATILE ORGANIC COMPOUNDS																			
Acetone	mg/kg	NA	7.76E+02	2.50E+00	NR					NR					NR				
Trichlorofluoromethane	mg/kg	NA	2.33E+03	1.00E-01	NR					NR					NR				

Table 5-1

Surface and Depositional Soil Analytical Results
Former Range 41, Parcel 95Q, and Impact Area, Choccolocco Corridor, Parcel 131Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location					HR-95Q-GP07					HR-95Q-GP08					HR-95Q-GP09				
Sample Number					QW0022					QW0024					QW0026				
Sample Date					12-Aug-02					12-Aug-02					13-Aug-02				
Sample Depth (Feet)					0- 1					0- 1					0- 1				
Parameter	Units	BKG[a]	SSSL[b]	ESV[b]	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	1.55E+04			YES	YES	2.96E+04		YES	YES	YES	1.12E+04			YES	YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					ND					ND				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	3.14E+00			YES		7.06E+00	J		YES		3.82E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	7.01E+01					9.14E+01					2.58E+02		YES		YES
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	5.49E-01	J				6.05E-01	J				3.97E-01	J			
Calcium	mg/kg	1.72E+03	NA	NA	9.19E+01	J				4.63E+02					1.83E+02				
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	1.55E+01				YES	2.18E+01				YES	2.49E+01			YES	YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	1.03E+01					8.44E+00					5.24E+00				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	5.11E+01		YES		YES	1.26E+01					6.04E+01		YES		YES
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	2.18E+04			YES	YES	2.80E+04			YES	YES	2.42E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	7.74E+01		YES		YES	2.18E+01					1.87E+02		YES		YES
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	4.21E+02					7.82E+02					2.71E+02				
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	6.54E+02			YES	YES	1.37E+03	J		YES	YES	9.79E+02			YES	YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	1.25E-01		YES		YES	1.47E-01		YES		YES	5.32E-02	J			
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	7.79E+00					1.12E+01		YES			5.13E+00				
Potassium	mg/kg	8.00E+02	NA	NA	6.40E+02					7.34E+02					3.82E+02	J			
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	9.17E-01	B	YES		YES	1.46E+00	J	YES		YES	7.36E-01	B	YES		
Silver	mg/kg	3.60E-01	3.91E+01	2.00E+00	ND					ND					ND				
Sodium	mg/kg	6.34E+02	NA	NA	2.58E+01	J				2.71E+01	J				2.55E+01	J			
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					ND					ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	2.50E+01				YES	4.12E+01				YES	2.72E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	2.41E+01					2.94E+01	J				1.94E+01				
VOLATILE ORGANIC COMPOUNDS																			
Acetone	mg/kg	NA	7.76E+02	2.50E+00	NR					NR					NR				
Trichlorofluoromethane	mg/kg	NA	2.33E+03	1.00E-01	NR					NR					NR				

Table 5-1

Surface and Depositional Soil Analytical Results
Former Range 41, Parcel 95Q, and Impact Area, Choccolocco Corridor, Parcel 131Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location					HR-95Q-MW01					HR-95Q-MW02					HR-95Q-MW03				
Sample Number					QW0014					QW0016					QW0018				
Sample Date					12-Aug-02					13-Aug-02					12-Aug-02				
Sample Depth (Feet)					0- 1					0- 1					0- 1				
Parameter	Units	BKG[a]	SSSL[b]	ESV[b]	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	1.81E+04		YES	YES	YES	1.03E+04			YES	YES	1.23E+04			YES	YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	4.78E+00	J	YES	YES	YES	4.30E+00	J	YES	YES	YES	ND				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	5.74E+00			YES		3.14E+00			YES		3.85E+00	J		YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	3.22E+01					4.57E+01					1.41E+02		YES		
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	4.42E-01	J				ND					6.37E-01	J			
Calcium	mg/kg	1.72E+03	NA	NA	6.79E+01	J				2.35E+02					7.27E+03		YES		
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	2.82E+01			YES	YES	1.79E+01				YES	1.72E+01				YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	3.88E+00					5.94E+00					6.62E+00				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	3.19E+02		YES	YES	YES	1.56E+02		YES		YES	1.14E+01				
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	3.92E+04		YES	YES	YES	2.17E+04			YES	YES	1.64E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	1.35E+03		YES	YES	YES	5.29E+02		YES	YES	YES	2.43E+01				
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	3.73E+02					3.77E+02					7.29E+02				
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	3.56E+02				YES	2.98E+02				YES	1.10E+03	J		YES	YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	8.28E-02	J	YES			5.02E-02	J				5.90E-02	J			
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	8.10E+00					8.26E+00					7.97E+00				
Potassium	mg/kg	8.00E+02	NA	NA	5.17E+02	J				8.81E+02		YES			8.55E+02		YES		
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	1.30E+00	B	YES		YES	7.20E-01	B	YES			7.86E-01	J	YES		
Silver	mg/kg	3.60E-01	3.91E+01	2.00E+00	ND					ND					ND				
Sodium	mg/kg	6.34E+02	NA	NA	2.65E+01	J				2.51E+01	J				2.67E+01	J			
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					ND					ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	3.82E+01				YES	1.92E+01				YES	1.85E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	3.42E+01					3.83E+01					2.32E+01	J			
VOLATILE ORGANIC COMPOUNDS																			
Acetone	mg/kg	NA	7.76E+02	2.50E+00	NR					NR					NR				
Trichlorofluoromethane	mg/kg	NA	2.33E+03	1.00E-01	NR					NR					NR				

Analyses performed using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods.

[a] BKG - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in SAIC, 1998, *Final Background Metals Survey Report, Fort McClellan, Alabama* , July.

[b] Residential human health site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT, 2000, *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama* , July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

J - Compound was positively identified; reported value is an estimated concentration.

mg/kg - Milligrams per kilogram.

NA - Not available.

ND - Not detected.

NR - Not requested.

Qual - Data validation qualifier.

Table 5-2

Subsurface Soil Analytical Results
Former Range 41, Parcel 95Q, and Impact Area, Choccolocco Corridor, Parcel 131Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location				HR-131Q-GP01				HR-131Q-GP02				HR-131Q-MW01				HR-95Q-GP01			
Sample Number				QY0002				QY0004				QY0006				QW0003			
Sample Date				13-Aug-02				13-Aug-02				13-Aug-02				12-Aug-02			
Sample Depth (Feet)				1 - 2				1 - 2				3 - 4				1 - 2			
Parameter	Units	BKG[a]	SSSL[b]	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
METALS																			
Aluminum	mg/kg	1.36E+04	7.80E+03	1.59E+04		YES	YES	1.28E+04			YES	1.64E+04		YES	YES	3.10E+04		YES	YES
Antimony	mg/kg	1.31E+00	3.11E+00	ND				4.56E+00	J	YES	YES	ND				ND			
Arsenic	mg/kg	1.83E+01	4.26E-01	3.57E+00			YES	4.00E+00			YES	3.59E+00			YES	8.77E+00	J		YES
Barium	mg/kg	2.34E+02	5.47E+02	2.02E+02				1.01E+02				6.40E+01				5.03E+01			
Beryllium	mg/kg	8.60E-01	9.60E+00	1.04E+00	J	YES		4.98E-01	J			3.90E-01	J			4.42E-01	J		
Calcium	mg/kg	6.37E+02	NA	6.72E+02		YES		2.51E+02				1.12E+02				7.46E+01	J		
Chromium	mg/kg	3.83E+01	2.32E+01	1.47E+01				1.90E+01				1.82E+01				3.39E+01			YES
Cobalt	mg/kg	1.75E+01	4.68E+02	8.93E+00				8.51E+00				3.74E+00				3.02E+00			
Copper	mg/kg	1.94E+01	3.13E+02	8.76E+00				2.06E+01		YES		7.07E+00				1.55E+01			
Iron	mg/kg	4.48E+04	2.34E+03	1.61E+04			YES	2.19E+04			YES	1.66E+04			YES	3.96E+04			YES
Lead	mg/kg	3.85E+01	4.00E+02	3.13E+01				1.13E+02		YES		8.69E+00				1.59E+01			
Magnesium	mg/kg	7.66E+02	NA	6.02E+02				4.48E+02				6.71E+02				5.17E+02			
Manganese	mg/kg	1.36E+03	3.63E+02	2.38E+03	J	YES	YES	8.19E+02	J		YES	2.56E+02	J			2.48E+02	J		
Mercury	mg/kg	7.00E-02	2.33E+00	4.90E-02	J			5.29E-02	J			5.56E-02	J			2.11E-01		YES	
Nickel	mg/kg	1.29E+01	1.54E+02	9.13E+00				5.69E+00				6.03E+00				9.33E+00			
Potassium	mg/kg	7.11E+02	NA	6.45E+02				7.55E+02		YES		4.90E+02	B			5.38E+02	J		
Selenium	mg/kg	4.70E-01	3.91E+01	1.27E+00		YES		9.23E-01	J	YES		8.01E-01	J	YES		1.72E+00	J	YES	
Silver	mg/kg	2.40E-01	3.91E+01	ND				ND				ND				ND			
Sodium	mg/kg	7.02E+02	NA	2.84E+01	J			3.05E+01	J			3.15E+01	J			2.19E+01	J		
Vanadium	mg/kg	6.49E+01	5.31E+01	2.00E+01				2.15E+01				2.56E+01				5.48E+01			YES
Zinc	mg/kg	3.49E+01	2.34E+03	1.98E+01	J			1.67E+01	J			1.78E+01	J			2.19E+01	J		
VOLATILE ORGANIC COMPOUNDS																			
Acetone	mg/kg	NA	7.76E+02	NR				NR				NR				4.00E-02	B		
Toluene	mg/kg	NA	1.55E+03	NR				NR				NR				2.00E-03	J		
PESTICIDES																			
4,4'-DDT	mg/kg	NA	1.79E+00	NR				NR				NR				4.10E-03	J		
EXPLOSIVES																			
2-Amino-4,6-dinitrotoluene	mg/kg	NA	4.64E-01	2.80E-01	J			ND				ND				ND			

Table 5-2

Subsurface Soil Analytical Results
Former Range 41, Parcel 95Q, and Impact Area, Choccolocco Corridor, Parcel 131Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location				HR-95Q-GP02				HR-95Q-GP03				HR-95Q-GP04				HR-95Q-GP05			
Sample Number				QW0005				QW0007				QW0009				QW0011			
Sample Date				12-Aug-02				12-Aug-02				12-Aug-02				13-Aug-02			
Sample Depth (Feet)				1 - 2				1 - 2				1 - 2				1 - 2			
Parameter	Units	BKG[a]	SSSL[b]	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
METALS																			
Aluminum	mg/kg	1.36E+04	7.80E+03	2.53E+04		YES	YES	2.71E+04		YES	YES	1.57E+04		YES	YES	2.70E+04		YES	YES
Antimony	mg/kg	1.31E+00	3.11E+00	ND				ND				ND				5.96E+00	J	YES	YES
Arsenic	mg/kg	1.83E+01	4.26E-01	8.77E+00	J		YES	7.15E+00	J		YES	4.30E+00			YES	5.98E+00			YES
Barium	mg/kg	2.34E+02	5.47E+02	4.84E+01				9.93E+01				6.32E+01				6.74E+01			
Beryllium	mg/kg	8.60E-01	9.60E+00	4.53E-01	J			5.27E-01	J			5.28E-01	J			6.81E-01	J		
Calcium	mg/kg	6.37E+02	NA	6.85E+01	J			1.06E+02	J			6.77E+01	J			1.98E+02			
Chromium	mg/kg	3.83E+01	2.32E+01	2.60E+01			YES	2.49E+01			YES	1.78E+01				1.94E+01			
Cobalt	mg/kg	1.75E+01	4.68E+02	2.72E+00				7.66E+00				7.47E+00				1.17E+01			
Copper	mg/kg	1.94E+01	3.13E+02	1.34E+01				1.17E+01				1.59E+02		YES		4.42E+01		YES	
Iron	mg/kg	4.48E+04	2.34E+03	4.01E+04			YES	3.09E+04			YES	2.87E+04			YES	2.76E+04			YES
Lead	mg/kg	3.85E+01	4.00E+02	1.49E+01				1.82E+01				3.68E+02		YES		1.41E+02		YES	
Magnesium	mg/kg	7.66E+02	NA	4.10E+02				5.40E+02				3.59E+02				6.63E+02			
Manganese	mg/kg	1.36E+03	3.63E+02	1.95E+02	J			9.02E+02	J		YES	3.75E+02			YES	1.73E+03		YES	YES
Mercury	mg/kg	7.00E-02	2.33E+00	1.54E-01		YES		1.43E-01		YES		7.68E-02	J	YES		9.95E-02	J	YES	
Nickel	mg/kg	1.29E+01	1.54E+02	7.14E+00				9.82E+00				7.20E+00				1.08E+01			
Potassium	mg/kg	7.11E+02	NA	6.32E+02				6.14E+02				7.54E+02		YES		7.37E+02		YES	
Selenium	mg/kg	4.70E-01	3.91E+01	1.29E+00	J	YES		1.02E+00	J	YES		1.27E+00	B	YES		1.29E+00	B	YES	
Silver	mg/kg	2.40E-01	3.91E+01	ND				ND				ND				ND			
Sodium	mg/kg	7.02E+02	NA	2.69E+01	J			2.52E+01	J			2.38E+01	J			3.17E+01	J		
Vanadium	mg/kg	6.49E+01	5.31E+01	4.89E+01				4.16E+01				2.77E+01				3.70E+01			
Zinc	mg/kg	3.49E+01	2.34E+03	1.78E+01	J			2.21E+01	J			3.66E+01		YES		2.99E+01			
VOLATILE ORGANIC COMPOUNDS																			
Acetone	mg/kg	NA	7.76E+02	NR				NR				NR				NR			
Toluene	mg/kg	NA	1.55E+03	NR				NR				NR				NR			
PESTICIDES																			
4,4'-DDT	mg/kg	NA	1.79E+00	NR				NR				NR				NR			
EXPLOSIVES																			
2-Amino-4,6-dinitrotoluene	mg/kg	NA	4.64E-01	ND				ND				ND				ND			

Table 5-2

Subsurface Soil Analytical Results
Former Range 41, Parcel 95Q, and Impact Area, Choccolocco Corridor, Parcel 131Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location				HR-95Q-GP06				HR-95Q-GP07				HR-95Q-GP08				HR-95Q-GP09			
Sample Number				QW0013				QW0023				QW0025				QW0027			
Sample Date				12-Aug-02				12-Aug-02				12-Aug-02				13-Aug-02			
Sample Depth (Feet)				2 - 3				1 - 2				2 - 3				1.5- 2.5			
Parameter	Units	BKG[a]	SSSL[b]	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
METALS																			
Aluminum	mg/kg	1.36E+04	7.80E+03	2.10E+04		YES	YES	1.59E+04		YES	YES	3.28E+04		YES	YES	1.63E+04		YES	YES
Antimony	mg/kg	1.31E+00	3.11E+00	ND				ND				ND				ND			
Arsenic	mg/kg	1.83E+01	4.26E-01	6.83E+00	J		YES	3.25E+00			YES	7.05E+00	J		YES	3.92E+00			YES
Barium	mg/kg	2.34E+02	5.47E+02	5.30E+01				9.33E+01				8.49E+01				1.01E+02			
Beryllium	mg/kg	8.60E-01	9.60E+00	4.07E-01	J			6.29E-01	J			9.45E-01	J	YES		1.08E+00	J	YES	
Calcium	mg/kg	6.37E+02	NA	6.12E+01	J			7.35E+01	J			1.00E+02	J			1.68E+02			
Chromium	mg/kg	3.83E+01	2.32E+01	2.13E+01				1.72E+01				1.81E+01				1.35E+01			
Cobalt	mg/kg	1.75E+01	4.68E+02	4.67E+00				7.98E+00				1.70E+01				7.54E+00			
Copper	mg/kg	1.94E+01	3.13E+02	1.23E+01				1.35E+01				1.18E+01				2.14E+01		YES	
Iron	mg/kg	4.48E+04	2.34E+03	2.81E+04			YES	2.66E+04			YES	2.93E+04			YES	1.79E+04			YES
Lead	mg/kg	3.85E+01	4.00E+02	1.24E+01				1.78E+01				2.40E+01				9.27E+01		YES	
Magnesium	mg/kg	7.66E+02	NA	6.72E+02				4.60E+02				7.71E+02		YES		4.98E+02			
Manganese	mg/kg	1.36E+03	3.63E+02	1.52E+02	J			5.59E+02			YES	3.46E+03	J	YES	YES	1.54E+03		YES	YES
Mercury	mg/kg	7.00E-02	2.33E+00	1.48E-01		YES		9.42E-02	J	YES		1.23E-01		YES		6.23E-02	J		
Nickel	mg/kg	1.29E+01	1.54E+02	7.89E+00				8.46E+00				1.49E+01		YES		8.20E+00			
Potassium	mg/kg	7.11E+02	NA	1.12E+03		YES		9.71E+02		YES		6.25E+02				8.66E+02		YES	
Selenium	mg/kg	4.70E-01	3.91E+01	1.35E+00	J	YES		1.02E+00	B	YES		1.52E+00	J	YES		ND			
Silver	mg/kg	2.40E-01	3.91E+01	ND				1.22E+00	J	YES		ND				ND			
Sodium	mg/kg	7.02E+02	NA	2.71E+01	J			3.15E+01	J			2.71E+01	J			3.14E+01	J		
Vanadium	mg/kg	6.49E+01	5.31E+01	3.31E+01				2.81E+01				3.88E+01				2.23E+01			
Zinc	mg/kg	3.49E+01	2.34E+03	2.17E+01	J			2.34E+01				3.14E+01	J			2.06E+01			
VOLATILE ORGANIC COMPOUNDS																			
Acetone	mg/kg	NA	7.76E+02	NR				NR				NR				NR			
Toluene	mg/kg	NA	1.55E+03	NR				NR				NR				NR			
PESTICIDES																			
4,4'-DDT	mg/kg	NA	1.79E+00	NR				NR				NR				NR			
EXPLOSIVES																			
2-Amino-4,6-dinitrotoluene	mg/kg	NA	4.64E-01	ND				ND				ND				ND			

Table 5-2

Subsurface Soil Analytical Results
Former Range 41, Parcel 95Q, and Impact Area, Choccolocco Corridor, Parcel 131Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location				HR-95Q-MW01				HR-95Q-MW02				HR-95Q-MW03			
Sample Number				QW0015				QW0017				QW0019			
Sample Date				12-Aug-02				13-Aug-02				12-Aug-02			
Sample Depth (Feet)				1 - 2				1 - 2				2 - 3			
Parameter	Units	BKG[a]	SSSL[b]	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
METALS															
Aluminum	mg/kg	1.36E+04	7.80E+03	2.15E+04		YES	YES	1.06E+04			YES	1.77E+04		YES	YES
Antimony	mg/kg	1.31E+00	3.11E+00	ND				5.14E+00	J	YES	YES	ND			
Arsenic	mg/kg	1.83E+01	4.26E-01	6.70E+00			YES	3.85E+00			YES	5.12E+00	J		YES
Barium	mg/kg	2.34E+02	5.47E+02	3.71E+01				5.16E+01				7.06E+01			
Beryllium	mg/kg	8.60E-01	9.60E+00	ND				4.59E-01	J			5.16E-01	J		
Calcium	mg/kg	6.37E+02	NA	6.39E+01	J			1.49E+02				2.77E+02			
Chromium	mg/kg	3.83E+01	2.32E+01	2.60E+01			YES	1.95E+01				1.52E+01			
Cobalt	mg/kg	1.75E+01	4.68E+02	3.40E+00				9.48E+00				3.25E+01		YES	
Copper	mg/kg	1.94E+01	3.13E+02	1.02E+02		YES		1.30E+02		YES		1.05E+01			
Iron	mg/kg	4.48E+04	2.34E+03	3.76E+04			YES	2.21E+04			YES	2.05E+04			YES
Lead	mg/kg	3.85E+01	4.00E+02	2.85E+02		YES		2.38E+02		YES		2.12E+01			
Magnesium	mg/kg	7.66E+02	NA	4.12E+02				3.70E+02				6.29E+02			
Manganese	mg/kg	1.36E+03	3.63E+02	1.49E+02				5.84E+02			YES	7.05E+02	J		YES
Mercury	mg/kg	7.00E-02	2.33E+00	1.18E-01		YES		5.38E-02	J			1.54E-01		YES	
Nickel	mg/kg	1.29E+01	1.54E+02	8.46E+00				6.64E+00				7.46E+00			
Potassium	mg/kg	7.11E+02	NA	6.05E+02				9.89E+02		YES		9.44E+02		YES	
Selenium	mg/kg	4.70E-01	3.91E+01	9.01E-01	B	YES		9.57E-01	B	YES		1.10E+00	J	YES	
Silver	mg/kg	2.40E-01	3.91E+01	ND				ND				ND			
Sodium	mg/kg	7.02E+02	NA	3.33E+01	J			2.67E+01	J			2.73E+01	J		
Vanadium	mg/kg	6.49E+01	5.31E+01	4.51E+01				1.87E+01				2.30E+01			
Zinc	mg/kg	3.49E+01	2.34E+03	2.51E+01				2.76E+01				2.01E+01	J		
VOLATILE ORGANIC COMPOUNDS															
Acetone	mg/kg	NA	7.76E+02	NR				NR				NR			
Toluene	mg/kg	NA	1.55E+03	NR				NR				NR			
PESTICIDES															
4,4'-DDT	mg/kg	NA	1.79E+00	NR				NR				NR			
EXPLOSIVES															
2-Amino-4,6-dinitrotoluene	mg/kg	NA	4.64E-01	ND				ND				ND			

Analyses performed using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods.

[a] BKG - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in SAIC, 1998, *Final Background Metals Survey Report, Fort McClellan, Alabama* , July.

[b] Residential human health site-specific screening level (SSSL) as given in IT, 2000, *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama* , July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

J - Compound was positively identified; reported value is an estimated concentration.

mg/kg - Milligrams per kilogram.

NA - Not available.

ND - Not detected.

NR - Not requested.

Qual - Data validation qualifier.

Table 5-3

Groundwater Analytical Results
Former Range 41, Parcel 95Q, and Impact Area, Choccolocco Corridor, Parcel 131Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location				HR-95Q-MW01				HR-95Q-MW02				HR-95Q-MW03			
Sample Number				QW3001				QW3002				QW3004			
Sample Date				22-Aug-02				20-Aug-02				21-Aug-02			
Parameter	**Units**	**BKG[a]**	**SSSL[b]**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**
METALS															
Aluminum	mg/L	2.34E+00	1.56E+00	1.55E-01	B			ND				ND			
Barium	mg/L	1.27E-01	1.10E-01	1.33E-02				7.63E-03	J			1.26E-02			
Calcium	mg/L	5.65E+01	NA	2.17E+00				9.59E-01	J			1.08E+00			
Copper	mg/L	2.55E-02	6.26E-02	1.39E-02	J			ND				ND			
Iron	mg/L	7.04E+00	4.69E-01	3.39E-01	J			1.05E-02	J			3.74E-02	J		
Magnesium	mg/L	2.13E+01	NA	1.01E+00				4.01E-01	J			5.87E-01	J		
Manganese	mg/L	5.81E-01	7.35E-02	2.92E-01			YES	7.94E-02	J		YES	4.50E-02	J		
Potassium	mg/L	7.20E+00	NA	2.68E+00	J			2.43E+00	J			ND			
Sodium	mg/L	1.48E+01	NA	1.26E+00				8.91E-01	J			7.89E-01	B		
Zinc	mg/L	2.20E-01	4.69E-01	1.09E-01				ND				ND			

Analyses performed using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods.

[a] BKG - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in SAIC, 1998, *Final Background Metals Survey Report, Fort McClellan, Alabama*, July.

[b] Residential human health site-specific screening level (SSSL) as given in IT, 2000, *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama*, July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

J - Compound was positively identified; reported value is an estimated concentration.

mg/L - Milligrams per liter.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

Table 5-4

Surface Water Analytical Results
Former Range 41, Parcel 95Q, and Impact Area, Choccolocco Corridor, Parcel 131Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location					HR-131Q-SW/SD01					HR-95Q-SW/SD01				
Sample Number					QY2001					QW2001				
Sample Date					18-Jul-02					18-Jul-02				
Parameter	Units	BKG[a]	SSSL[b]	ESV[b]	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS														
Aluminum	mg/L	5.26E+00	1.53E+01	8.70E-02	1.62E-01	J			YES	1.17E-01	J			YES
Barium	mg/L	7.54E-02	1.10E+00	3.90E-03	2.27E-02				YES	2.18E-02				YES
Calcium	mg/L	2.52E+01	NA	1.16E+02	9.13E-01	J				2.65E-01	J			
Cobalt	mg/L	NA	9.31E-01	3.00E-03	1.83E-02	J			YES	ND				
Copper	mg/L	1.27E-02	6.23E-01	6.54E-03	6.28E-03	J				6.90E-03	J			YES
Iron	mg/L	1.96E+01	4.70E+00	1.00E+00	3.32E-01	J				7.07E-01	J			
Magnesium	mg/L	1.10E+01	NA	8.20E+01	3.04E-01	J				3.24E-01	J			
Manganese	mg/L	5.65E-01	6.40E-01	8.00E-02	9.78E-03	J				2.86E-02	J			
Potassium	mg/L	2.56E+00	NA	5.30E+01	1.32E+00	J				2.29E+00	J			
Sodium	mg/L	3.44E+00	NA	6.80E+02	1.16E+00					1.16E+00				
VOLATILE ORGANIC COMPOUNDS														
Methylene chloride	mg/L	NA	1.42E-01	1.93E+00	NR					3.00E-04	B			

Analyses performed using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods.

[a] BKG - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in SAIC, 1998, *Final Background Metals Survey Report, Fort McClellan, Alabama*, July.

[b] Recreational site user site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT, 2000, *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama*, July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

J - Compound was positively identified; reported value is an estimated concentration.

mg/L - Milligrams per liter.

NA - Not available.

ND - Not detected.

NR - Not requested.

Qual - Data validation qualifier.

Table 5-5

Sediment Analytical Results
Former Range 41, Parcel 95Q, and Impact Area, Choccolocco Corridor, Parcel 131Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location					HR-131Q-SW/SD01					HR-95Q-SW/SD01				
Sample Number					QY1001					QW1001				
Sample Date					18-Jul-02					18-Jul-02				
Sample Depth (Feet)					0- 0.5					0- 0.5				
Parameter	Units	BKG[a]	SSSL[b]	ESV[b]	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS														
Aluminum	mg/kg	8.59E+03	1.15E+06	NA	6.66E+03					4.14E+03	J			
Arsenic	mg/kg	1.13E+01	5.58E+01	7.24E+00	3.18E+00					2.60E+00	J			
Barium	mg/kg	9.89E+01	8.36E+04	NA	1.25E+02		YES			6.29E+01	J			
Beryllium	mg/kg	9.70E-01	1.50E+02	NA	6.50E-01	J				4.86E-01	J			
Calcium	mg/kg	1.11E+03	NA	NA	4.99E+02					1.66E+02	J			
Chromium	mg/kg	3.12E+01	2.79E+03	5.23E+01	1.60E+01					6.38E+00				
Cobalt	mg/kg	1.10E+01	6.72E+04	5.00E+01	1.93E+01		YES			4.10E+00				
Copper	mg/kg	1.71E+01	4.74E+04	1.87E+01	2.95E+01		YES		YES	1.58E+01	J			
Iron	mg/kg	3.53E+04	3.59E+05	NA	1.50E+04					1.51E+04				
Lead	mg/kg	3.78E+01	4.00E+02	3.02E+01	3.04E+01				YES	3.47E+01	J			YES
Magnesium	mg/kg	9.06E+02	NA	NA	3.11E+02					1.85E+02	J			
Manganese	mg/kg	7.12E+02	4.38E+04	NA	9.02E+02		YES			2.51E+02	J			
Nickel	mg/kg	1.30E+01	1.76E+04	1.59E+01	9.51E+00					2.52E+00				
Potassium	mg/kg	1.01E+03	NA	NA	9.09E+02					9.56E+02				
Selenium	mg/kg	7.20E-01	5.96E+03	NA	9.19E-01	J	YES			7.36E-01	J	YES		
Sodium	mg/kg	6.92E+02	NA	NA	ND					2.32E+01	J			
Vanadium	mg/kg	4.09E+01	4.83E+03	NA	1.11E+01					8.39E+00				
Zinc	mg/kg	5.27E+01	3.44E+05	1.24E+02	3.42E+01					1.05E+01	J			
VOLATILE ORGANIC COMPOUNDS														
Acetone	mg/kg	NA	1.03E+05	4.53E-01	NR					5.40E-02	J			
TOTAL ORGANIC CARBON														
Total Organic Carbon	mg/kg	NA	NA	NA	3.73E+04					8.86E+03				

Analyses performed using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods.

[a] BKG - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in SAIC, 1998, *Final Background Metals Survey Report, Fort McClellan, Alabama*, July.

[b] Recreational site user site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT, 2000, *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama,* July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

J - Compound was positively identified; reported value is an estimated concentration.

mg/kg - Milligrams per kilogram.

NA - Not available.

ND - Not detected.

NR - Not requested.

Qual - Data validation qualifier.

95Q-MW01, and HR-95Q-MW02). All of the antimony results were flagged with a "J" data qualifier, indicating that concentrations were estimated below method reporting limits.

- Copper (319 mg/kg) exceeded its SSSL (313 mg/kg) and background (12.7 mg/kg) at one sample location.

- Iron (34,800 to 40,700 mg/kg) exceeded its SSSL (2,345 mg/kg) and background (34,154 mg/kg) at six sample locations.

- Lead (508 to 1,350 mg/kg) exceeded its SSSL (400 mg/kg) and background (40 mg/kg) at three sample locations.

- Manganese (1,750 and 2,210 mg/kg) exceeded its SSSL (363 mg/kg) and background (1,579 mg/kg) at two sample locations.

Figure 5-1 shows the surface and depositional soil sample locations with metals results exceeding SSSLs and background.

Twelve metals were detected at concentrations exceeding ESVs: aluminum, antimony, barium, chromium, copper, iron, lead, manganese, mercury, selenium, thallium, and vanadium. Of these, the following nine metals also exceeded their respective background values:

- Aluminum (18,100 to 29,800 mg/kg) exceeded its SSSL (7,803 mg/kg) and background (16,306 mg/kg) at seven sample locations.

- Antimony (4.3 to 4.78 mg/kg) exceeded its ESV (3.5 mg/kg) and background (1.99 mg/kg) at three sample locations.

- Barium (258 and 320 mg/kg) exceeded its ESV (165 mg/kg) and background (124 mg/kg) at two sample locations.

- Copper (51 to 319 mg/kg) exceeded its ESV (40 mg/kg) and background (12.7 mg/kg) at eight sample locations.

- Iron (34,800 to 40,700 mg/kg) exceeded its ESV (200 mg/kg) and background (34,154 mg/kg) at six sample locations.

- Lead (65 to 1,350 mg/kg) exceeded its ESV (50 mg/kg) and background (40 mg/kg) at ten sample locations.

DRAFT. CHCK. BY:
ENGR. CHCK. BY: S. MORAN
INITIATOR: T. WINTON
PROJ. MGR.: J. YACOUB
DRAWN BY: D. BOMAR
STARTING DATE: 04/04/03
1/21/2004 10:14:48 AM
lstout
c:\cadd\Design\796887es.708
DWG. NO.: ...\796887es.708
PROJ. NO.: 796887
DRAWN BY:
DATE LAST REV.:

N 1,175,400
E 693,800
E 695,800
N 1,173,800

950
925
900
875
800
775
750

Sample Identification		BKG	SSSL	HR-95Q-GP01
Sample Number				QW0001
Sample Date				12-Aug-02
Aluminum	mg/kg	1.63E+04	7.80E+03	2.24E+04
Iron	mg/kg	3.42E+04	2.34E+03	3.48E+04

Sample Identification		BKG	SSSL	HR-95Q-GP02
Sample Number				QW0004
Sample Date				12-Aug-02
Aluminum	mg/kg	1.63E+04	7.80E+03	2.09E+04
Iron	mg/kg	3.42E+04	2.34E+03	3.81E+04

Sample Identification		BKG	SSSL	HR-95Q-MW01
Sample Number				QW0014
Sample Date				12-Aug-02
Aluminum	mg/kg	1.63E+04	7.80E+03	1.81E+04
Antimony	mg/kg	1.99E+00	3.11E+00	4.78E+00 J
Copper	mg/kg	1.27E+01	3.13E+02	3.19E+02
Iron	mg/kg	3.42E+04	2.34E+03	3.92E+04
Lead	mg/kg	4.01E+01	4.00E+02	1.35E+03

Sample Identification		BKG	SSSL	HR-95Q-GP03
Sample Number				QW0006
Sample Date				12-Aug-02
Aluminum	mg/kg	1.63E+04	7.80E+03	2.98E+04
Antimony	mg/kg	1.99E+00	3.11E+00	4.47E+00 J
Iron	mg/kg	3.42E+04	2.34E+03	3.51E+04

Sample Identification		BKG	SSSL	HR-95Q-MW02
Sample Number				QW0016
Sample Date				13-Aug-02
Antimony	mg/kg	1.99E+00	3.11E+00	4.30E+00 J
Lead	mg/kg	4.01E+01	4.00E+02	5.29E+02

Sample Identification		BKG	SSSL	HR-95Q-GP04
Sample Number				QW0008
Sample Date				12-Aug-02
Lead	mg/kg	4.01E+01	4.00E+02	5.08E+02

Sample Identification		BKG	SSSL	HR-95Q-DEP01
Sample Number				QW0020
Sample Date				18-Jul-02
Aluminum	mg/kg	1.63E+04	7.80E+03	2.31E+04 J
Iron	mg/kg	3.42E+04	2.34E+03	4.07E+04

Sample Identification		BKG	SSSL	HR-95Q-GP05
Sample Number				QW0010
Sample Date				13-Aug-02
Aluminum	mg/kg	1.63E+04	7.80E+03	2.95E+04
Iron	mg/kg	3.42E+04	2.34E+03	3.52E+04
Manganese	mg/kg	1.58E+03	3.63E+02	1.75E+03

Sample Identification		BKG	SSSL	HR-95Q-GP08
Sample Number				QW0024
Sample Date				12-Aug-02
Aluminum	mg/kg	1.63E+04	7.80E+03	2.96E+04

Sample Identification		BKG	SSSL	HR-131Q-GP01
Sample Number				QY0001
Sample Date				13-Aug-02
Manganese	mg/kg	1.58E+03	3.63E+02	2.21E+03 J

HR-95Q-GP01
HR-95Q-GP02
HR-95Q-MW01
HR-95Q-MW02(SB)
HR-95Q-GP03
HR-95Q-GP04
HR-95Q-DEP01
HR-95Q-GP07
HR-95Q-MW03
HR-95Q-GP05
HR-95Q-GP08
HR-95Q-DEP02
HR-95Q-GP06
HR-95Q-GP09
HR-131Q-GP01
HR-131Q-MW01 (WELL DRY)
HR-131Q-GP02
HR-131Q-DEP01
FLOW
FLOW
PARCEL 131Q-X

LEGEND

- UNIMPROVED ROADS AND PARKING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 25 FOOT)
- TREES / TREELINE
- PARCEL BOUNDARY
- FIRING LINE
- SURFACE DRAINAGE / CREEK
- BERM
- SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- GROUNDWATER, SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- MONITORING WELL / SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- DEPOSITIONAL SOIL SAMPLE LOCATION
- (SB) SOIL BORING LOCATION
- J METAL WAS POSITIVELY IDENTIFIED; REPORTED VALUE IS AN ESTIMATED CONCENTRATION
- mg/kg MILLIGRAMS PER KILOGRAM
- SSSL SITE-SPECIFIC SCREENING LEVEL
- BKG BACKGROUND

SCALE
0 200 400 FEET

FIGURE 5-1
METALS EXCEEDING SSSLs AND BACKGROUND IN SURFACE AND DEPOSITIONAL SOIL FORMER RANGE 41, PARCEL 95Q IMPACT AREA, CHOCCOLOCCO CORRIDOR, PARCEL 131Q-X

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

Shaw™ Shaw Environmental, Inc.

- Manganese (1,750 and 2,210 mg/kg) exceeded its ESV (100 mg/kg) and background (1,579 mg/kg) at two sample locations.

- Mercury (0.114 to 0.158 mg/kg) exceeded its ESV (0.1 mg/kg) and background (0.08 mg/kg) at six sample locations.

- Selenium (0.85 to 2.02 mg/kg) exceeded its ESV (0.81 mg/kg) and background (0.48 mg/kg) at 13 sample locations.

Figure 5-2 shows the surface and depositional soil sample locations with metals results exceeding ESVs and background.

Volatile Organic Compounds. Two surface and depositional soil sample locations (HR-95Q-DEP01 and HR-95Q-GP01) were analyzed for VOCs. Two VOCs (acetone and trichlorofluoromethane) were detected in the samples at concentrations below their respective SSSLs and ESVs.

Semivolatile Organic Compounds. Two surface and depositional soil sample locations (HR-95Q-DEP01 and HR-95Q-GP01) were analyzed for SVOCs. SVOCs were not detected in the samples.

Pesticides. Two surface and depositional soil sample locations (HR-95Q-DEP01 and HR-95Q-GP01) were analyzed for pesticides. Pesticides were not detected in the samples.

Herbicides. Two surface and depositional soil sample locations (HR-95Q-DEP01 and HR-95Q-GP01) were analyzed for herbicides. Herbicides were not detected in the samples.

Explosives. Explosive compounds were not detected in the surface and depositional soil samples.

5.2 Subsurface Soil Analytical Results

Fifteen subsurface soil samples were collected for chemical analysis at Parcels 95Q and 131Q-X. Subsurface soil samples were collected at depths greater than 1 foot bgs at the locations shown on Figure 3-1. Analytical results were compared to residential human health SSSLs and metals background concentrations, as presented in Table 5-2.

Metals. A total of 21 metals were detected in the subsurface soil samples. The concentrations of seven metals (aluminum, antimony, arsenic, chromium, iron, manganese, and vanadium)

DRAFT. CHCK. BY:
ENGR. CHCK. BY: S. MORAN
INITIATOR: T. WINTON
PROJ. MGR.: J. YACOUB
STARTING DATE: 04/04/03
DRAWN BY: D. BOMAR
DATE LAST REV.: 1/21/2004
DRAWN BY: 10:20:05 AM
DWG. NO.: ...\796887es.709
PROJ. NO.: 796887
lstout
c:\cadd\Design\796887es.709

N 1,175,400
E 693,800
E 695,800
N 1,173,800

950
925
900
750

FLOW

PARCEL 95Q
PARCEL 131Q-X

HR-95Q-GP01
HR-95Q-GP02
HR-95Q-MW01
HR-95Q-MW02(SB)
HR-95Q-GP03
HR-95Q-GP04
HR-95Q-DEP01
HR-95Q-GP07
HR-95Q-MW03
HR-95Q-GP05
HR-95Q-GP08
HR-95Q-DEP02
HR-95Q-GP06
HR-131Q-GP01
HR-131Q-MW01 (WELL DRY)
HR-131Q-GP02
HR-95Q-GP09
▲HR-131Q-DEP01

Sample Identification		BKG	ESV	HR-95Q-GP01
Sample Number				QW0001
Sample Date				12-Aug-02
Aluminum	mg/kg	1.63E+04	5.00E+01	2.24E+04
Iron	mg/kg	3.42E+04	2.00E+02	3.48E+04
Mercury	mg/kg	8.00E-02	1.00E-01	1.33E-01
Selenium	mg/kg	4.80E-01	8.10E-01	1.49E+00 J

Sample Identification		BKG	ESV	HR-95Q-GP02
Sample Number				QW0004
Sample Date				12-Aug-02
Aluminum	mg/kg	1.63E+04	5.00E+01	2.09E+04
Iron	mg/kg	3.42E+04	2.00E+02	3.81E+04
Mercury	mg/kg	8.00E-02	1.00E-01	1.58E-01
Selenium	mg/kg	4.80E-01	8.10E-01	1.33E+00 J

Sample Identification		BKG	ESV	HR-95Q-MW01
Sample Number				QW0014
Sample Date				12-Aug-02
Aluminum	mg/kg	1.63E+04	5.00E+01	1.81E+04
Antimony	mg/kg	1.99E+00	3.50E+00	4.78E+00 J
Copper	mg/kg	1.27E+01	4.00E+01	3.19E+02
Iron	mg/kg	3.42E+04	2.00E+02	3.92E+04
Lead	mg/kg	4.01E+01	5.00E+01	1.35E+03
Selenium	mg/kg	4.80E-01	8.10E-01	1.30E+00 B

Sample Identification		BKG	ESV	HR-95Q-GP03
Sample Number				QW0006
Sample Date				12-Aug-02
Aluminum	mg/kg	1.63E+04	5.00E+01	2.98E+04
Antimony	mg/kg	1.99E+00	3.50E+00	4.47E+00 J
Iron	mg/kg	3.42E+04	2.00E+02	3.51E+04
Mercury	mg/kg	8.00E-02	1.00E-01	1.42E-01
Selenium	mg/kg	4.80E-01	8.10E-01	2.02E+00 J

Sample Identification		BKG	ESV	HR-95Q-MW02
Sample Number				QW0016
Sample Date				13-Aug-02
Antimony	mg/kg	1.99E+00	3.50E+00	4.30E+00 J
Copper	mg/kg	1.27E+01	4.00E+01	1.56E+02
Lead	mg/kg	4.01E+01	5.00E+01	5.29E+02

Sample Identification		BKG	ESV	HR-95Q-GP04
Sample Number				QW0008
Sample Date				12-Aug-02
Copper	mg/kg	1.27E+01	4.00E+01	1.82E+02
Lead	mg/kg	4.01E+01	5.00E+01	5.08E+02
Selenium	mg/kg	4.80E-01	8.10E-01	9.60E-01 B

Sample Identification		BKG	ESV	HR-95Q-GP07
Sample Number				QW0022
Sample Date				12-Aug-02
Copper	mg/kg	1.27E+01	4.00E+01	5.11E+01
Lead	mg/kg	4.01E+01	5.00E+01	7.74E+01
Mercury	mg/kg	8.00E-02	1.00E-01	1.25E-01
Selenium	mg/kg	4.80E-01	8.10E-01	9.17E-01 B

Sample Identification		BKG	ESV	HR-95Q-DEP01
Sample Number				QW0020
Sample Date				18-Jul-02
Aluminum	mg/kg	1.63E+04	5.00E+01	2.31E+04 J
Copper	mg/kg	1.27E+01	4.00E+01	7.53E+01
Iron	mg/kg	3.42E+04	2.00E+02	4.07E+04
Lead	mg/kg	4.01E+01	5.00E+01	1.87E+02 J
Selenium	mg/kg	4.80E-01	8.10E-01	1.63E+00

Sample Identification		BKG	ESV	HR-95Q-GP05
Sample Number				QW0010
Sample Date				13-Aug-02
Aluminum	mg/kg	1.63E+04	5.00E+01	2.95E+04
Copper	mg/kg	1.27E+01	4.00E+01	7.67E+01
Iron	mg/kg	3.42E+04	2.00E+02	3.52E+04
Lead	mg/kg	4.01E+01	5.00E+01	2.01E+02
Manganese	mg/kg	1.58E+03	1.00E+02	1.75E+03
Mercury	mg/kg	8.00E-02	1.00E-01	1.14E-01
Selenium	mg/kg	4.80E-01	8.10E-01	1.65E+00

Sample Identification		BKG	ESV	HR-95Q-GP08
Sample Number				QW0024
Sample Date				12-Aug-02
Aluminum	mg/kg	1.63E+04	5.00E+01	2.96E+04
Mercury	mg/kg	8.00E-02	1.00E-01	1.47E-01
Selenium	mg/kg	4.80E-01	8.10E-01	1.46E+00 J

Sample Identification		BKG	ESV	HR-95Q-GP09
Sample Number				QW0026
Sample Date				13-Aug-02
Barium	mg/kg	1.24E+02	1.65E+02	2.58E+02
Copper	mg/kg	1.27E+01	4.00E+01	6.04E+01
Lead	mg/kg	4.01E+01	5.00E+01	1.87E+02

Sample Identification		BKG	ESV	HR-95Q-GP06
Sample Number				QW0012
Sample Date				12-Aug-02
Selenium	mg/kg	4.80E-01	8.10E-01	1.01E+00 J

Sample Identification		BKG	ESV	HR-131Q-GP02
Sample Number				QY0003
Sample Date				13-Aug-02
Lead	mg/kg	4.01E+01	5.00E+01	1.90E+02
Selenium	mg/kg	4.80E-01	8.10E-01	1.08E+00

Sample Identification		BKG	ESV	HR-131Q-GP01
Sample Number				QY0001
Sample Date				13-Aug-02
Barium	mg/kg	1.24E+02	1.65E+02	3.20E+02
Lead	mg/kg	4.01E+01	5.00E+01	6.50E+01
Manganese	mg/kg	1.58E+03	1.00E+02	2.21E+03 J
Selenium	mg/kg	4.80E-01	8.10E-01	8.47E-01 J

Sample Identification		BKG	ESV	HR-95Q-DEP02
Sample Number				QW0021
Sample Date				17-Jul-02
Copper	mg/kg	1.27E+01	4.00E+01	6.22E+01
Lead	mg/kg	4.01E+01	5.00E+01	1.84E+02 J
Selenium	mg/kg	4.80E-01	8.10E-01	8.51E-01 J

LEGEND

- UNIMPROVED ROADS AND PARKING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 25 FOOT)
- TREES / TREELINE
- PARCEL BOUNDARY
- FIRING LINE
- SURFACE DRAINAGE / CREEK
- BERM
- SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- GROUNDWATER, SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- MONITORING WELL / SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- ▲ DEPOSITIONAL SOIL SAMPLE LOCATION
- (SB) SOIL BORING LOCATION
- J METAL WAS POSITIVELY IDENTIFIED; REPORTED VALUE IS AN ESTIMATED CONCENTRATION
- B ANALYTE DETECTED IN LABORATORY OR FIELD BLANK AT CONCENTRATION GREATER THAN THE REPORTING LIMIT (AND GREATER THAN ZERO)
- mg/kg MILLIGRAMS PER KILOGRAM
- ESV ECOLOGICAL SCREENING VALUE
- BKG BACKGROUND

SCALE
0 200 400 FEET

FIGURE 5-2
METALS EXCEEDING ESVs AND BACKGROUND IN SURFACE AND DEPOSITIONAL SOIL FORMER RANGE 41, PARCEL 95Q IMPACT AREA, CHOCCOLOCCO CORRIDOR, PARCEL 131Q-X

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

Shaw™ Shaw Environmental, Inc.

exceeded their respective SSSLs in one or more samples. Of these, aluminum, antimony, and manganese results exceeded their respective background values:

- Aluminum (15,700 to 32,800 mg/kg) exceeded its SSSL (7,803 mg/kg) and background (13,591 mg/kg) at 13 sample locations.
- Antimony (4.56 to 5.96 mg/kg) exceeded its SSSL (3.11 mg/kg) and background (1.31 mg/kg) at three sample locations. All of the antimony results were flagged with a "J" data qualifier, indicating that concentrations were estimated below method reporting limits.
- Manganese (1,540 to 3,460 mg/kg) exceeded its SSSL (363 mg/kg) and background (1,355 mg/kg) at four sample locations.

Figure 5-3 shows the subsurface soil sample locations with metals results exceeding SSSLs and background.

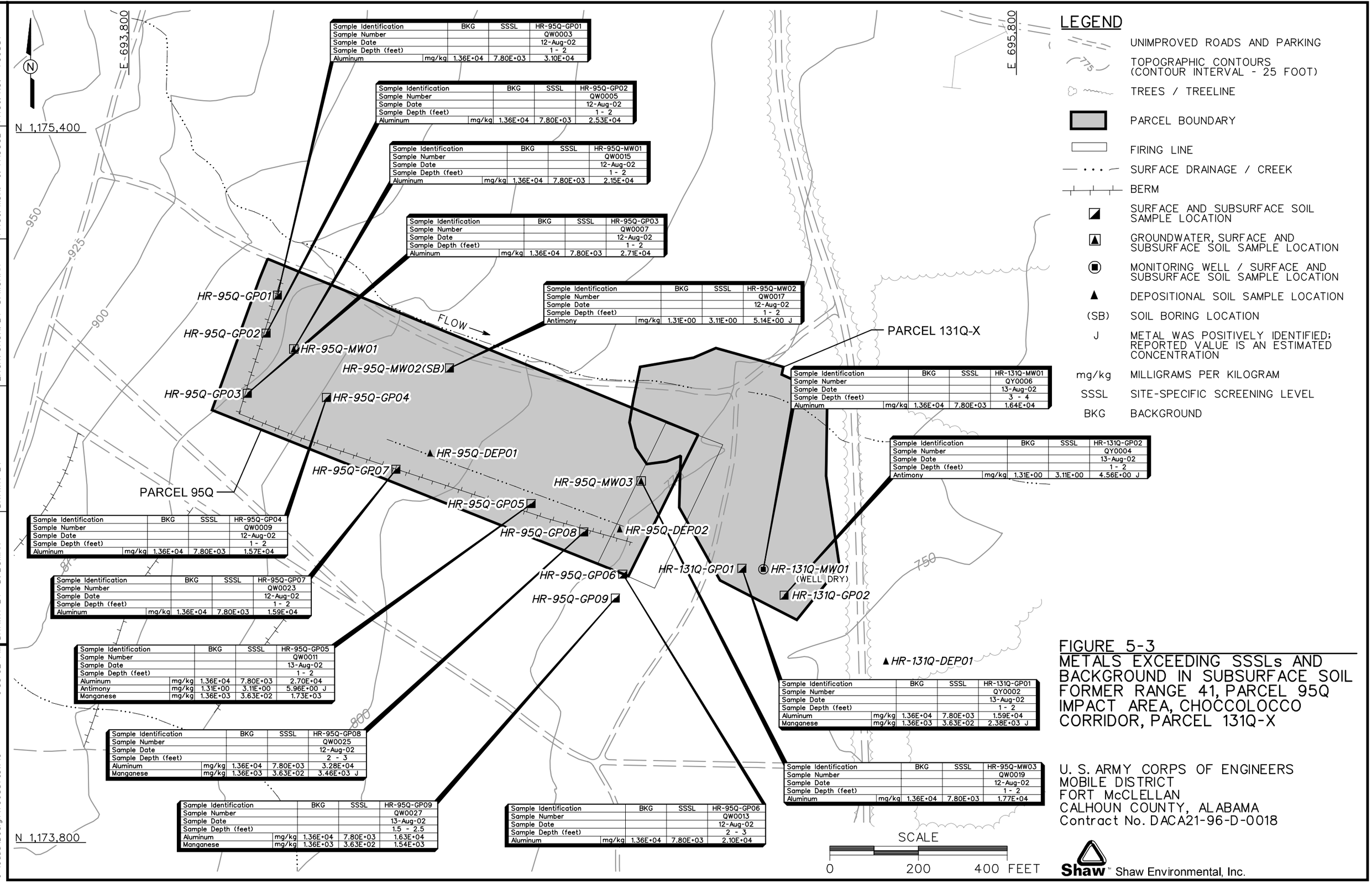
Volatile Organic Compounds. One subsurface soil sample location (HR-95Q-GP01) was analyzed for VOCs. Two VOCs (acetone and toluene) were detected in the sample at concentrations below their respective SSSLs.

Semivolatile Organic Compounds. One subsurface soil sample location (HR-95Q-GP01) was analyzed for SVOCs. SVOCs were not detected in the sample.

Pesticides. One subsurface soil sample location (HR-95Q-GP01) was analyzed for pesticides. One pesticide (4,4'-dichlorodiphenyltrichloroethane [DDT]) was detected in the sample at an estimated concentration below its SSSL.

Herbicides. One subsurface soil sample location (HR-95Q-GP01) was analyzed for herbicides. Herbicides were not detected in the sample.

Explosives. One explosive compound (2-amino-4,6-dinitrotoluene) was detected at one subsurface soil sample location (HR-131Q-GP01) at an estimated concentration below its SSSL.



Sample Identification		BKG	SSSL	HR-95Q-GP01
Sample Number				QW0003
Sample Date				12-Aug-02
Sample Depth (feet)				1 - 2
Aluminum	mg/kg	1.36E+04	7.80E+03	3.10E+04

Sample Identification		BKG	SSSL	HR-95Q-GP02
Sample Number				QW0005
Sample Date				12-Aug-02
Sample Depth (feet)				1 - 2
Aluminum	mg/kg	1.36E+04	7.80E+03	2.53E+04

Sample Identification		BKG	SSSL	HR-95Q-MW01
Sample Number				QW0015
Sample Date				12-Aug-02
Sample Depth (feet)				1 - 2
Aluminum	mg/kg	1.36E+04	7.80E+03	2.15E+04

Sample Identification		BKG	SSSL	HR-95Q-GP03
Sample Number				QW0007
Sample Date				12-Aug-02
Sample Depth (feet)				1 - 2
Aluminum	mg/kg	1.36E+04	7.80E+03	2.71E+04

Sample Identification		BKG	SSSL	HR-95Q-MW02
Sample Number				QW0017
Sample Date				12-Aug-02
Sample Depth (feet)				1 - 2
Antimony	mg/kg	1.31E+00	3.11E+00	5.14E+00 J

Sample Identification		BKG	SSSL	HR-131Q-MW01
Sample Number				QY0006
Sample Date				13-Aug-02
Sample Depth (feet)				3 - 4
Aluminum	mg/kg	1.36E+04	7.80E+03	1.64E+04

Sample Identification		BKG	SSSL	HR-131Q-GP02
Sample Number				QY0004
Sample Date				13-Aug-02
Sample Depth (feet)				1 - 2
Antimony	mg/kg	1.31E+00	3.11E+00	4.56E+00 J

Sample Identification		BKG	SSSL	HR-95Q-GP04
Sample Number				QW0009
Sample Date				12-Aug-02
Sample Depth (feet)				1 - 2
Aluminum	mg/kg	1.36E+04	7.80E+03	1.57E+04

Sample Identification		BKG	SSSL	HR-95Q-GP07
Sample Number				QW0023
Sample Date				12-Aug-02
Sample Depth (feet)				1 - 2
Aluminum	mg/kg	1.36E+04	7.80E+03	1.59E+04

Sample Identification		BKG	SSSL	HR-95Q-GP05
Sample Number				QW0011
Sample Date				13-Aug-02
Sample Depth (feet)				1 - 2
Aluminum	mg/kg	1.36E+04	7.80E+03	2.70E+04
Antimony	mg/kg	1.31E+00	3.11E+00	5.96E+00 J
Manganese	mg/kg	1.36E+03	3.63E+02	1.73E+03

Sample Identification		BKG	SSSL	HR-95Q-GP08
Sample Number				QW0025
Sample Date				12-Aug-02
Sample Depth (feet)				2 - 3
Aluminum	mg/kg	1.36E+04	7.80E+03	3.28E+04
Manganese	mg/kg	1.36E+03	3.63E+02	3.46E+03 J

Sample Identification		BKG	SSSL	HR-95Q-GP09
Sample Number				QW0027
Sample Date				13-Aug-02
Sample Depth (feet)				1.5 - 2.5
Aluminum	mg/kg	1.36E+04	7.80E+03	1.63E+04
Manganese	mg/kg	1.36E+03	3.63E+02	1.54E+03

Sample Identification		BKG	SSSL	HR-95Q-GP06
Sample Number				QW0013
Sample Date				12-Aug-02
Sample Depth (feet)				2 - 3
Aluminum	mg/kg	1.36E+04	7.80E+03	2.10E+04

Sample Identification		BKG	SSSL	HR-131Q-GP01
Sample Number				QY0002
Sample Date				13-Aug-02
Sample Depth (feet)				1 - 2
Aluminum	mg/kg	1.36E+04	7.80E+03	1.59E+04
Manganese	mg/kg	1.36E+03	3.63E+02	2.38E+03 J

Sample Identification		BKG	SSSL	HR-95Q-MW03
Sample Number				QW0019
Sample Date				12-Aug-02
Sample Depth (feet)				1 - 2
Aluminum	mg/kg	1.36E+04	7.80E+03	1.77E+04

LEGEND

- UNIMPROVED ROADS AND PARKING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 25 FOOT)
- TREES / TREELINE
- PARCEL BOUNDARY
- FIRING LINE
- SURFACE DRAINAGE / CREEK
- BERM
- SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- GROUNDWATER, SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- MONITORING WELL / SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- DEPOSITIONAL SOIL SAMPLE LOCATION
- (SB) SOIL BORING LOCATION
- J METAL WAS POSITIVELY IDENTIFIED; REPORTED VALUE IS AN ESTIMATED CONCENTRATION
- mg/kg MILLIGRAMS PER KILOGRAM
- SSSL SITE-SPECIFIC SCREENING LEVEL
- BKG BACKGROUND

FIGURE 5-3
METALS EXCEEDING SSSLs AND BACKGROUND IN SUBSURFACE SOIL FORMER RANGE 41, PARCEL 95Q IMPACT AREA, CHOCCOLOCCO CORRIDOR, PARCEL 131Q-X

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

Shaw™ Shaw Environmental, Inc.

DWG. NO.: ...\796887es.710 | PROJ. NO.: 796887
INITIATOR: T. WINTON | PROJ. MGR.: J. YACOUB
DRAFT. CHCK. BY: | ENGR. CHCK. BY: S. MORAN
DATE LAST REV.: | DRAWN BY:
STARTING DATE: 04/04/03 | DRAWN BY: D. BOMAR
1/19/2004 6:33:02 PM
lstout c:\cadd\Design\796887es.710

5.3 Groundwater Analytical Results

Three groundwater samples were collected for chemical analysis at Parcels 95Q and 131Q-X, at the locations shown on Figure 3-1. Analytical results were compared to residential human health SSSLs and metals background concentrations, as presented in Table 5-3.

Metals. A total of 10 metals were detected in the groundwater samples. Of the detected metals, only manganese exceeded its SSSL in two samples. However, the manganese results were below its background value.

Volatile Organic Compounds. One groundwater sample location (HR-95Q-MW02) was analyzed for VOCs. VOCs were not detected in the sample.

Semivolatile Organic Compounds. One groundwater sample location (HR-95Q-MW02) was analyzed for SVOCs. SVOCs were not detected in the sample.

Pesticides. One groundwater sample location (HR-95Q-MW02) was analyzed for pesticides. Pesticides were not detected in the sample.

Herbicides. One groundwater sample location (HR-95Q-MW02) was analyzed for herbicides. Herbicides were not detected in the sample.

Explosives. Explosive compounds were not detected in the groundwater samples.

5.4 Surface Water Analytical Results

Two surface water samples were collected for chemical analysis at Parcels 95Q and 131Q-X, at the locations shown on Figure 3-1. Analytical results were compared to recreational site user human health SSSLs, ESVs, and metals background concentrations, as presented in Table 5-4. It should be noted that the assumptions for residential and recreational site user exposure to surface water are identical.

Metals. A total of 10 metals were detected in the surface water samples at concentrations below SSSLs. The concentrations of four metals (aluminum, barium, cobalt, and copper) exceeded their respective ESVs but were below background values.

Volatile Organic Compounds. One surface water sample location (HR-95Q-SW/SD01) was analyzed for VOCs. One VOC (methylene chloride) was detected in the sample at a concentration below its SSSL and ESV.

Semivolatile Organic Compounds. One surface water sample location (HR-95Q-SW/SD01) was analyzed for SVOCs. SVOCs were not detected in the sample.

Pesticides. One surface water sample location (HR-95Q-SW/SD01) was analyzed for pesticides. Pesticides were not detected in the sample.

Herbicides. One surface water sample location (HR-95Q-SW/SD01) was analyzed for herbicides. Herbicides were not detected in the sample.

Explosives. Explosive compounds were not detected in the surface water samples.

5.5 Sediment Analytical Results

Two sediment samples were collected for chemical and physical analyses at Parcels 95Q and 131Q-X, at the locations shown on Figure 3-1. Analytical results were compared to recreational site user human health SSSLs, ESVs, and metals background concentrations, as presented in Table 5-5. It should be noted that the assumptions for residential and recreational site user exposure to sediment are identical.

Metals. A total of 18 metals were detected in the sediment samples at concentrations below SSSLs. The concentrations of two metals (copper and lead) exceeded their respective ESVs but were below background values except for copper (29.5 mg/kg), which exceeded its ESV (18.7 mg/kg) and background (17.1 mg/kg) at one sample location (HR-131Q-SW/SD01).

Volatile Organic Compounds. One sediment sample location (HR-95Q-SW/SD01) was analyzed for VOCs. Acetone was detected in the sample at an estimated concentration below its SSSL and ESV.

Semivolatile Organic Compounds. One sediment sample location (HR-95Q-SW/SD01) was analyzed for SVOCs. SVOCs were not detected in the sample.

Pesticides. One sediment sample location (HR-95Q-SW/SD01) was analyzed for pesticides. Pesticides were not detected in the sample.

Herbicides. One sediment sample location (HR-95Q-SW/SD01) was analyzed for herbicides. Herbicides were not detected in the sample.

Explosives. Explosive compounds were not detected in the sediment samples.

Total Organic Carbon. The sediment samples were analyzed for TOC content. TOC concentrations in the samples were 37,300 and 8,860 mg/kg, as summarized in Appendix F.

Grain Size. The results of grain size analysis for the sediment samples are included in Appendix F.

6.0 Summary, Conclusions, and Recommendations

Shaw conducted an SI at Former Range 41, Parcel 95Q, and Impact Area, Choccolocco Corridor, Parcel 131Q-X, at FTMC in Calhoun County, Alabama. The SI was conducted to determine whether chemical constituents are present at the site as a result of historical mission-related Army activities. The SI consisted of the collection and analysis of 15 surface soil samples, 3 depositional soil samples, 15 subsurface soil samples, 3 groundwater samples, 2 surface water samples, and 2 sediment samples. In addition, 4 permanent monitoring wells were installed in the saturated zone to facilitate groundwater sample collection and to provide site-specific geological and hydrogeological characterization information. However, one of the wells did not produce sufficient groundwater for sampling.

Chemical analysis of samples collected at the site indicates that metals and VOCs were detected in the various site media. In addition, one pesticide and one explosive compound were detected in one subsurface soil sample each. SVOCs and herbicides were not detected in any of the samples. Analytical results were compared to SSSLs, ESVs, and background screening values developed for human health and ecological risk evaluations as part of investigations being performed under the BRAC Environmental Restoration Program at FTMC.

Constituents detected at concentrations exceeding SSSLs and background (where available) were identified as COPCs in site media. COPCs identified were six metals (aluminum, antimony, copper, iron, lead, and manganese) in surface soil, and three metals (aluminum, antimony, and manganese) in subsurface soil. The most significant COPC was lead, concentrations of which (508, 529, and 1,350 mg/kg) exceeded its residential SSSL (400 mg/kg) in three surface soil samples. No COPCs were identified for groundwater, surface water, or sediment. VOC, pesticide, and explosive compound concentrations in site media were all below SSSLs.

Constituents detected at concentrations exceeding ESVs and background (where available) were identified as constituents of potential ecological concern (COPEC) in surface soil, surface water, and sediment. COPECs included nine metals (aluminum, antimony, barium, copper, iron, lead, manganese, mercury, and selenium) in surface soil and copper in one sediment sample. No COPECs were identified for surface water.

Based on the results of the SI, past operations at Parcels 95Q and 131Q-X have impacted the environment. Therefore, Shaw recommends that a remedial investigation be conducted to determine the extent of metals contamination in soil at Former Range 41, Parcel 95Q, and Impact Area, Choccolocco Corridor, Parcel 131Q-X.

7.0 References

American Society for Testing and Materials (ASTM), 2000, ***Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)***, ASTM D 2488-00.

Cloud, P. E., Jr., 1966, ***Bauxite Deposits of the Anniston, Fort Payne, and Asheville Areas, Northeast Alabama***, U. S. Geological Survey Bulletin 1199-O, 35p.

Environmental Science and Engineering, Inc. (ESE), 1998, ***Final Environmental Baseline Survey, Fort McClellan, Alabama***, prepared for U.S. Army Environmental Center, Aberdeen Proving Ground, Maryland, January.

Hunt, Roy E., 1986, ***Geotechnical Engineering Techniques and Practices***, McGraw-Hill Book Co., New York.

IT Corporation (IT), 2002a, ***Final Site-Specific Field Sampling Plan, Site-Specific Safety and Health Plan, and Site-Specific Unexploded Ordnance Safety Plan Attachments, Former Range 41, Parcel 95Q, and Impact Area, Choccolocco Corridor, Parcel 131Q-X, Fort McClellan, Calhoun County, Alabama***, April.

IT Corporation (IT), 2002b, ***Draft Installation-Wide Sampling and Analysis Plan, Fort McClellan, Calhoun Country, Alabama,*** Revision 3, prepared for the U.S. Army Corps of Engineers, Mobile District, February.

IT Corporation (IT), 2000a, ***Final Installation-Wide Sampling and Analysis Plan, Fort McClellan, Calhoun County, Alabama***, March.

IT Corporation (IT), 2000b, ***Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama***, July.

IT Corporation (IT), 1998, ***Final Installation-Wide Work Plan, Fort McClellan, Calhoun County, Alabama***, August.

Moser, P. H., and S. S. DeJarnette, 1992, ***Ground-water Availability in Calhoun County, Alabama***, Geological Survey of Alabama Special Map 228.

Osborne, W. E., 1999, Personal communication with John Hofer, IT Corporation.

Osborne, W. E., and M. W. Szabo, 1984, ***Stratigraphy and Structure of the Jacksonville Fault, Calhoun County, Alabama***, Geological Survey of Alabama Circular 117.

Osborne, W. E., G. D. Irving, and W. E. Ward, 1997, ***Geologic Map of the Anniston 7.5' Quadrangle, Calhoun County, Alabama***, Geological Survey of Alabama Preliminary Map, 1 sheet.

Osborne, W. E., M. W. Szabo, C. W. Copeland, Jr., and T. L. Neathery, 1989, ***Geologic Map of Alabama***, Geological Survey of Alabama Special Map 221, scale 1:500,000, 1 sheet.

Osborne, W. E., M. W. Szabo, T. L. Neathery, and C. W. Copeland, compilers, 1988, ***Geologic Map of Alabama, Northeast Sheet***, Geological Survey of Alabama Special Map 220, Scale 1:250,000.

Raymond, D. E., W. E. Osborne, C. W. Copeland, and T. L. Neathery, 1988, ***Alabama Stratigraphy***, Geological Survey of Alabama, Tuscaloosa, Alabama.

Science Applications International Corporation, 1998, ***Final Background Metals Survey Report, Fort McClellan, Alabama***, July.

Thomas, W. A., and T. L. Neathery, 1982, ***Appalachian Thrust Belts in Alabama: Tectonics and Sedimentation***, Geologic Society of America 1982 Annual Meeting, New Orleans, Louisiana, Field Trip, Alabama Geological Society Guidebook 19A.

Thomas, W. A., and J. A. Drahovzal, 1974, ***The Coosa Deformed Belt in the Alabama Appalachians***, Alabama Geological Society, 12th Annual Field Trip Guidebook 98 p.

U.S. Army Corps of Engineers (USACE), 2001a, ***Archives Search Report, Maps, Fort McClellan, Anniston, Alabama***, Revision 1, September.

U.S. Army Corps of Engineers (USACE), 2001b, ***Requirements for the Preparation of Sampling and Analysis Plans***, Engineer Manual EM 200-1-3, February.

U.S. Department of Agriculture (USDA), 1961, ***Soil Survey, Calhoun County, Alabama***, Soil Conservation Service, Series 1958, No. 9, September.

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, 1998, Unedited Local Climatological Data, Anniston, Alabama, January - December 1998.

Warman, J. C., and L. V. Causey, 1962, ***Geology and Ground-water Resources of Calhoun County, Alabama,*** Geological Survey of Alabama County Report 7.

ATTACHMENT 1

LIST OF ABBREVIATIONS AND ACRONYMS

List of Abbreviations and Acronyms

2,4-D	2,4-dichlorophenoxyacetic acid
2,4,5-T	2,4,5-trichlorophenoxyacetic acid
2,4,5-TP	2,4,5-trichlorophenoxypropionic acid
3D	3D International Environmental Group
AB	ambient blank
AbB3	Anniston gravelly clay loam, 2 to 6 percent slopes, severely eroded
AbC3	Anniston gravelly clay loam, 6 to 10 percent slopes, severely eroded
AbD3	Anniston and Allen gravelly clay loams, 10 to 15 percent slopes, eroded
Abs	skin absorption
ABS	dermal absorption factor
AC	hydrogen cyanide
ACAD	AutoCadd
AcB2	Anniston and Allen gravelly loams, 2 to 6 percent slopes, eroded
AcC2	Anniston and Allen gravelly loams, 6 to 10 percent slopes, eroded
AcD2	Anniston and Allen gravelly loams, 10 to 15 percent slopes, eroded
AcE2	Anniston and Allen gravelly loams, 15 to 25 percent slopes, eroded
ACGIH	American Conference of Governmental Industrial Hygienists
AdE	Anniston and Allen stony loam, 10 to 25 percent slope
ADEM	Alabama Department of Environmental Management
ADPH	Alabama Department of Public Health
AEC	U.S. Army Environmental Center
AEDA	ammunition, explosives, and other dangerous articles
AEL	airborne exposure limit
AET	adverse effect threshold
AF	soil-to-skin adherence factor
AHA	ammunition holding area
AL	Alabama
ALARNG	Alabama Army National Guard
ALAD	δ-aminolevulinic acid dehydratase
ALDOT	Alabama Department of Transportation
amb.	amber
amsl	above mean sea level
ANAD	Anniston Army Depot
AOC	area of concern
AP	armor piercing
APEC	areas of potential ecological concern
APT	armor-piercing tracer
AR	analysis request
ARAR	applicable or relevant and appropriate requirement
AREE	area requiring environmental evaluation
AS/SVE	air sparging/soil vapor extraction
ASP	Ammunition Supply Point
ASR	Archives Search Report
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
AT	averaging time
ATSDR	Agency for Toxic Substances and Disease Registry
ATV	all-terrain vehicle
AUF	area use factor
AWARE	Associated Water and Air Resources Engineers, Inc.
AWQC	ambient water quality criteria
AWWSB	Anniston Water Works and Sewer Board
'B'	Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero)
BCF	blank correction factor; bioconcentration factor
BCT	BRAC Cleanup Team
BERA	baseline ecological risk assessment
BEHP	bis(2-ethylhexyl)phthalate
BFB	bromofluorobenzene
BFE	base flood elevation
BG	Bacillus globigii
BGR	Bains Gap Road
bgs	below ground surface
BHC	hexachlorocyclohexane
BHHRA	baseline human health risk assessment
BIRTC	Branch Immaterial Replacement Training Center
bkg	background
bls	below land surface
BOD	biological oxygen demand
Bp	soil-to-plant biotransfer factors
BRAC	Base Realignment and Closure
Braun	Braun Intertec Corporation
BSAF	biota-to-sediment accumulation factors
BSC	background screening criterion
BTAG	Biological Technical Assistance Group
BTEX	benzene, toluene, ethyl benzene, and xylenes
BTOC	below top of casing
BTV	background threshold value
BW	biological warfare; body weight
BZ	breathing zone; 3-quinuclidinyl benzilate
C	ceiling limit value
Ca	carcinogen
$CaCO_3$	calcium carbonate
CAA	Clean Air Act
CAB	chemical warfare agent breakdown products
CACM	Chemical Agent Contaminated Media
CAMU	corrective action management unit
CBR	chemical, biological, and radiological
CCAL	continuing calibration
CCB	continuing calibration blank
CCV	continuing calibration verification
CD	compact disc
CDTF	Chemical Defense Training Facility
CEHNC	U.S. Army Engineering and Support Center, Huntsville
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERFA	Community Environmental Response Facilitation Act
CESAS	Corps of Engineers South Atlantic Savannah
CF	conversion factor
CFC	chlorofluorocarbon
CFDP	Center for Domestic Preparedness
CFR	Code of Federal Regulations
CG	phosgene (carbonyl chloride)
CGI	combustible gas indicator
ch	inorganic clays of high plasticity
CHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
CIH	Certified Industrial Hygienist
CK	cyanogen chloride
cl	inorganic clays of low to medium plasticity
Cl	chlorinated
CLP	Contract Laboratory Program
cm	centimeter
CN	chloroacetophenone
CNB	chloroacetophenone, benzene, and carbon tetrachloride
CNS	chloroacetophenone, chloropicrin, and chloroform
CO	carbon monoxide
CO_2	carbon dioxide
Co-60	cobalt-60
CoA	Code of Alabama
COC	chain of custody; chemical of concern
COE	Corps of Engineers
Con	skin or eye contact
COPC	chemical of potential concern
COPEC	constituent of potential ecological concern
CPSS	chemicals present in site samples
CQCSM	Contract Quality Control System Manager
CRDL	contract-required detection limit
CRL	certified reporting limit
CRQL	contract-required quantitation limit
CRZ	contamination reduction zone
Cs-137	cesium-137
CS	ortho-chlorobenzylidene-malononitrile
CSEM	conceptual site exposure model
CSM	conceptual site model
CT	central tendency
ctr.	container
CWA	chemical warfare agent; Clean Water Act
CWM	chemical warfare material; clear, wide mouth
CX	dichloroformoxime
'D'	duplicate; dilution
D&I	detection and identification
DAAMS	depot area agent monitoring station
DAF	dilution-attenuation factor
DANC	decontamination agent, non-corrosive
ºC	degrees Celsius

List of Abbreviations and Acronyms *(Continued)*

ºF	degrees Fahrenheit
DCA	dichloroethane
DCE	dichloroethene
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethene
DDT	dichlorodiphenyltrichloroethane
DEH	Directorate of Engineering and Housing
DEP	depositional soil
DFTPP	decafluorotriphenylphosphine
DI	deionized
DID	data item description
DIMP	di-isopropylmethylphosphonate
DM	dry matter; adamsite
DMBA	dimethylbenz(a)anthracene
DMMP	dimethylmethylphosphonate
DO	dissolved oxygen
DOD	U.S. Department of Defense
DOJ	U.S. Department of Justice
DOT	U.S. Department of Transportation
DP	direct-push
DPDO	Defense Property Disposal Office
DPT	direct-push technology
DQO	data quality objective
DRMO	Defense Reutilization and Marketing Office
DRO	diesel range organics
DS	deep (subsurface) soil
DS2	Decontamination Solution Number 2
DSERTS	Defense Site Environmental Restoration Tracking System
DWEL	drinking water equivalent level
E&E	Ecology and Environment, Inc.
EB	equipment blank
EBS	environmental baseline survey
EC_{50}	effects concentration for 50 percent of a population
ECBC	Edgewood Chemical Biological Center
ED	exposure duration
EDD	electronic data deliverable
EF	exposure frequency
EDQL	ecological data quality level
EE/CA	engineering evaluation and cost analysis
Elev.	elevation
EM	electromagnetic
EMI	Environmental Management Inc.
EM31	Geonics Limited EM31 Terrain Conductivity Meter
EM61	Geonics Limited EM61 High-Resolution Metal Detector
EOD	explosive ordnance disposal
EODT	explosive ordnance disposal team
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
EPIC	Environmental Photographic Interpretation Center
EPRI	Electrical Power Research Institute
ER	equipment rinsate
ERA	ecological risk assessment
ER-L	effects range-low
ER-M	effects range-medium
ESE	Environmental Science and Engineering, Inc.
ESMP	Endangered Species Management Plan
ESN	Environmental Services Network, Inc.
ESV	ecological screening value
ET	exposure time
EU	exposure unit
Exp.	explosives
E-W	east to west
EZ	exclusion zone
FAR	Federal Acquisition Regulations
FB	field blank
FD	field duplicate
FDC	Former Decontamination Complex
FDA	U.S. Food and Drug Administration
Fe^{+3}	ferric iron
Fe^{+2}	ferrous iron
FedEx	Federal Express, Inc.
FEMA	Federal Emergency Management Agency
FFCA	Federal Facilities Compliance Act
FFE	field flame expedient
FFS	focused feasibility study
FI	fraction of exposure
Fil	filtered
Flt	filtered
FMDC	Fort McClellan Development Commission
FML	flexible membrane liner
f_{oc}	fraction organic carbon
FOMRA	Former Ordnance Motor Repair Area
FOST	Finding of Suitability to Transfer
Foster Wheeler	Foster Wheeler Environmental Corporation
FR	Federal Register
Frtn	fraction
FS	field split; feasibility study
FSP	field sampling plan
ft	feet
ft/day	feet per day
ft/ft	feet per foot
ft/yr	feet per year
FTA	Fire Training Area
FTMC	Fort McClellan
FTRRA	FTMC Reuse & Redevelopment Authority
g	gram
g/m^3	gram per cubic meter
G-856	Geometrics, Inc. G-856 magnetometer
G-858G	Geometrics, Inc. G-858G magnetic gradiometer
GAF	gastrointestinal absorption factor
gal	gallon
gal/min	gallons per minute
GB	sarin (isopropyl methylphosphonofluoridate)
gc	clay gravels; gravel-sand-clay mixtures
GC	gas chromatograph
GCL	geosynthetic clay liner
GC/MS	gas chromatograph/mass spectrometer
GCR	geosynthetic clay liner
GFAA	graphite furnace atomic absorption
GIS	Geographic Information System
gm	silty gravels; gravel-sand-silt mixtures
gp	poorly graded gravels; gravel-sand mixtures
gpm	gallons per minute
GPR	ground-penetrating radar
GPS	global positioning system
GRA	general response action
GS	ground scar
GSA	General Services Administration; Geologic Survey of Alabama
GSBP	Ground Scar Boiler Plant
GSSI	Geophysical Survey Systems, Inc.
GST	ground stain
GW	groundwater
gw	well-graded gravels; gravel-sand mixtures
H&S	health and safety
HA	hand auger
HC	mixture of hexachloroethane, aluminum powder, and zinc oxide (smoke producer)
HCl	hydrochloric acid
HD	distilled mustard (bis-[dichloroethyl]sulfide)
HDPE	high-density polyethylene
HE	high explosive
HEAST	Health Effects Assessment Summary Tables
Herb.	herbicides
HHRA	human health risk assessment
HI	hazard index
H_2O_2	hydrogen peroxide
HPLC	high-performance liquid chromatography
HNO_3	nitric acid
HQ	hazard quotient
HQ_{screen}	screening-level hazard quotient
hr	hour
HRC	hydrogen releasing compound
HSA	hollow-stem auger
HTRW	hazardous, toxic, and radioactive waste
‘I’	out of control, data rejected due to low recovery

IASPOW	Impact Area South of POW Training Facility
IATA	International Air Transport Authority
ICAL	initial calibration
ICB	initial calibration blank
ICP	inductively-coupled plasma
ICRP	International Commission on Radiological Protection
ICS	interference check sample
ID	inside diameter
IDL	instrument detection limit
IDLH	immediately dangerous to life or health
IDM	investigative-derived media
IDW	investigation-derived waste
IEUBK	Integrated Exposure Uptake Biokinetic
IF	ingestion factor; inhalation factor
ILCR	incremental lifetime cancer risk
IMPA	isopropylmethyl phosphonic acid
IMR	Iron Mountain Road
in.	inch
Ing	ingestion
Inh	inhalation
IP	ionization potential
IPS	International Pipe Standard
IR	ingestion rate
IRDMIS	Installation Restoration Data Management Information System
IRIS	Integrated Risk Information Service
IRP	Installation Restoration Program
IS	internal standard
ISCP	Installation Spill Contingency Plan
IT	IT Corporation
ITEMS	IT Environmental Management System™
'J'	estimated concentration
JeB2	Jefferson gravelly fine sandy loam, 2 to 6 percent slopes, eroded
JeC2	Jefferson gravelly fine sandy loam, 6 to 10 percent slopes, eroded
JfB	Jefferson stony fine sandy loam, 0 to 10 percent slopes have strong slopes
JPA	Joint Powers Authority
K	conductivity
K_d	soil-water distribution coefficient
kg	kilogram
KeV	kilo electron volt
K_{oc}	organic carbon partioning coefficient
K_{ow}	octonal-water partition coefficient
$KMnO_4$	potassium permanganate
L	liter; Lewisite (dichloro-[2-chloroethyl]sulfide)
L/kg/day	liters per kilogram per day
l	liter
LAW	light anti-tank weapon
lb	pound
LBP	lead-based paint
LC	liquid chromatography
LCS	laboratory control sample
LC_{50}	lethal concentration for 50 percent population tested
LD_{50}	lethal dose for 50 percent population tested
LEL	lower explosive limit
LOAEL	lowest-observed-adverse-effects-level
LRA	land redevelopment authority
LT	less than the certified reporting limit
LUC	land-use control
LUCAP	land-use control assurance plan
LUCIP	land-use control implementation plan
max	maximum
MB	method blank
MCL	maximum contaminant level
MCLG	maximum contaminant level goal
MCPA	4-chloro-2-methylphenoxyacetic acid
MCPP	2-(2-methyl-4-chlorophenoxy)propionic acid
MCS	media cleanup standard
MD	matrix duplicate
MDC	maximum detected concentration
MDCC	maximum detected constituent concentration
MDL	method detection limit
mg	milligrams
mg/kg	milligrams per kilogram
mg/kg/day	milligram per kilogram per day
mg/kgbw/day	milligrams per kilogram of body weight per day
mg/L	milligrams per liter
mg/m^3	milligrams per cubic meter
mh	inorganic silts, micaceous or diatomaceous fine, sandy or silt soils
MHz	megahertz
µg/g	micrograms per gram
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
µmhos/cm	micromhos per centimeter
MeV	mega electron volt
min	minimum
MINICAMS	miniature continuous air monitoring system
ml	inorganic silts and very fine sands
mL	milliliter
mm	millimeter
MM	mounded material
MMBtu/hr	million Btu per hour
MNA	monitored natural attenuation
MnO_4-	permanganate ion
MOA	Memorandum of Agreement
MOGAS	motor vehicle gasoline
MOUT	Military Operations in Urban Terrain
MP	Military Police
MPA	methyl phosphonic acid
MPM	most probable munition
MQL	method quantitation limit
MR	molasses residue
MRL	method reporting limit
MS	matrix spike
mS/cm	millisiemens per centimeter
mS/m	millisiemens per meter
MSD	matrix spike duplicate
MTBE	methyl tertiary butyl ether
msl	mean sea level
MtD3	Montevallo shaly, silty clay loam, 10 to 40 percent slopes , severely eroded
mV	millivolts
MW	monitoring well
MWI&MP	Monitoring Well Installation and Management Plan
Na	sodium
NA	not applicable; not available
NAD	North American Datum
NAD83	North American Datum of 1983
$NaMnO_4$	sodium permanganate
NAVD88	North American Vertical Datum of 1988
NAS	National Academy of Sciences
NCEA	National Center for Environmental Assessment
NCP	National Contingency Plan
NCRP	National Council on Radiation Protection and Measurements
ND	not detected
NE	no evidence; northeast
ne	not evaluated
NEW	net explosive weight
NFA	No Further Action
NG	National Guard
NGP	National Guardsperson
ng/L	nanograms per liter
NGVD	National Geodetic Vertical Datum
Ni	nickel
NIC	notice of intended change
NIOSH	National Institute for Occupational Safety and Health
NIST	National Institute of Standards and Technology
NLM	National Library of Medicine
NO_3^-	nitrate
NPDES	National Pollutant Discharge Elimination System
NPW	net present worth
No.	number
NOAA	National Oceanic and Atmospheric Administration
NOAEL	no-observed-adverse-effects-level
NR	not requested; not recorded; no risk
NRC	National Research Council
NRCC	National Research Council of Canada

NRHP	National Register of Historic Places
NRT	near real time
ns	nanosecond
N-S	north to south
NS	not surveyed
NSA	New South Associates, Inc.
nT	nanotesla
nT/m	nanoteslas per meter
NTU	nephelometric turbidity unit
nv	not validated
O_2	oxygen
O_3	ozone
O&G	oil and grease
O&M	operation and maintenance
OB/OD	open burning/open detonation
OD	outside diameter
OE	ordnance and explosives
oh	organic clays of medium to high plasticity
OH•	hydroxyl radical
ol	organic silts and organic silty clays of low plasticity
OP	organophosphorus
ORC	Oxygen Releasing Compound
ORP	oxidation-reduction potential
OSHA	Occupational Safety and Health Administration
OSWER	Office of Solid Waste and Emergency Response
OVM-PID/FID	organic vapor meter-photoionization detector/flame ionization detector
OWS	oil/water separator
oz	ounce
PA	preliminary assessment
PAH	polynuclear aromatic hydrocarbon
PARCCS	precision, accuracy, representativeness, comparability, completeness, and sensitivity
Parsons	Parsons Engineering Science, Inc.
Pb	lead
PBMS	performance-based measurement system
PC	permeability coefficient
PCB	polychlorinated biphenyl
PCDD	polychlorinated dibenzo-p-dioxins
PCDF	polychlorinated dibenzofurans
PCE	perchloroethene
PCP	pentachlorophenol
PDS	Personnel Decontamination Station
PEF	particulate emission factor
PEL	permissible exposure limit
PERA	preliminary ecological risk assessment
PES	potential explosive site
Pest.	pesticides
PETN	pentaerythritoltetranitrate
PFT	portable flamethrower
PG	professional geologist
PID	photoionization detector
PkA	Philo and Stendal soils local alluvium, 0 to 2 percent slopes
PM	project manager
POC	point of contact
POL	petroleum, oils, and lubricants
POTW	publicly owned treatment works
POW	prisoner of war
PP	peristaltic pump; Proposed Plan
ppb	parts per billion
ppbv	parts per billion by volume
PPE	personal protective equipment
ppm	parts per million
PPMP	Print Plant Motor Pool
ppt	parts per thousand
PR	potential risk
PRA	preliminary risk assessment
PRG	preliminary remediation goal
PS	chloropicrin
PSSC	potential site-specific chemical
pt	peat or other highly organic silts
PVC	polyvinyl chloride
QA	quality assurance
QA/QC	quality assurance/quality control
QAM	quality assurance manual
QAO	quality assurance officer
QAP	installation-wide quality assurance plan
QC	quality control
QST	QST Environmental, Inc.
qty	quantity
Qual	qualifier
R	rejected data; resample; retardation factor
R&A	relevant and appropriate
RA	remedial action
RAO	remedial action objective
RBC	risk-based concentration; red blood cell
RCRA	Resource Conservation and Recovery Act
RCWM	Recovered Chemical Warfare Material
RD	remedial design
RDX	cyclotrimethylenetrinitramine
ReB3	Rarden silty clay loams
REG	regular field sample
REL	recommended exposure limit
RFA	request for analysis
RfC	reference concentration
RfD	reference dose
RGO	remedial goal option
RI	remedial investigation
RL	reporting limit
RME	reasonable maximum exposure
ROD	Record of Decision
RPD	relative percent difference
RR	Range residue
RRF	relative response factor
RSD	relative standard deviation
RTC	Recruiting Training Center
RTECS	Registry of Toxic Effects of Chemical Substances
RTK	real-time kinematic
RWIMR	Ranges West of Iron Mountain Road
SA	exposed skin surface area
SAD	South Atlantic Division
SAE	Society of Automotive Engineers
SAIC	Science Applications International Corporation
SAP	installation-wide sampling and analysis plan
SARA	Superfund Amendments and Reauthorization Act
sc	clayey sands; sand-clay mixtures
Sch.	schedule
SCM	site conceptual model
SD	sediment
SDG	sample delivery group
SDWA	Safe Drinking Water Act
SDZ	safe distance zone; surface danger zone
SEMS	Southern Environmental Management & Specialties, Inc.
SF	cancer slope factor
SFSP	site-specific field sampling plan
SGF	standard grade fuels
Shaw	Shaw Environmental, Inc.
SHP	installation-wide safety and health plan
SI	site investigation
SINA	Special Interest Natural Area
SL	standing liquid
SLERA	screening-level ecological risk assessment
sm	silty sands; sand-silt mixtures
SM	Serratia marcescens
SMDP	Scientific Management Decision Point
s/n	signal-to-noise ratio
SO_4^{-2}	sulfate
SOD	soil oxidant demand
SOP	standard operating procedure
SOPQAM	U.S. EPA's *Standard Operating Procedure/Quality Assurance Manual*
sp	poorly graded sands; gravelly sands
SP	submersible pump
SPCC	system performance calibration compound
SPCS	State Plane Coordinate System
SPM	sample planning module

SQRT	screening quick reference tables
Sr-90	strontium-90
SRA	streamlined human health risk assessment
SRM	standard reference material
Ss	stony rough land, sandstone series
SS	surface soil
SSC	site-specific chemical
SSHO	site safety and health officer
SSHP	site-specific safety and health plan
SSL	soil screening level
SSSL	site-specific screening level
SSSSL	site-specific soil screening level
STB	supertropical bleach
STC	source-term concentration
STD	standard deviation
STEL	short-term exposure limit
STL	Severn-Trent Laboratories
STOLS	Surface Towed Ordnance Locator System®
Std. units	standard units
SU	standard unit
SUXOS	senior UXO supervisor
SVOC	semivolatile organic compound
SW	surface water
SW-846	U.S. EPA's *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*
SWMU	solid waste management unit
SWPP	storm water pollution prevention plan
SZ	support zone
TAL	target analyte list
TAT	turn around time
TB	trip blank
TBC	to be considered
TCA	trichloroethane
TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
TCDF	tetrachlorodibenzofurans
TCE	trichloroethene
TCL	target compound list
TCLP	toxicity characteristic leaching procedure
TDEC	Tennessee Department of Environment and Conservation
TDGCL	thiodiglycol
TDGCLA	thiodiglycol chloroacetic acid
TEA	triethylaluminum
Tetryl	trinitrophenylmethylnitramine
TERC	Total Environmental Restoration Contract
THI	target hazard index
TIC	tentatively identified compound
TLV	threshold limit value
TN	Tennessee
TNT	trinitrotoluene
TOC	top of casing; total organic carbon
TPH	total petroleum hydrocarbons
TR	target cancer risk
TRADOC	U.S. Army Training and Doctrine Command
TRPH	total recoverable petroleum hydrocarbons
TSCA	Toxic Substances Control Act
TSDF	treatment, storage, and disposal facility
TWA	time-weighted average
UCL	upper confidence limit
UCR	upper certified range
'U'	not detected above reporting limit
UIC	underground injection control
UF	uncertainty factor
USACE	U.S. Army Corps of Engineers
USACHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
USAEC	U.S. Army Environmental Center
USAEHA	U.S. Army Environmental Hygiene Agency
USACMLS	U.S. Army Chemical School
USAMPS	U.S. Army Military Police School
USATCES	U.S. Army Technical Center for Explosive Safety
USATEU	U.S. Army Technical Escort Unit
USATHAMA	U.S. Army Toxic and Hazardous Material Agency
USC	United States Code
USCS	Unified Soil Classification System
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tank
UTL	upper tolerance level; upper tolerance limit
UXO	unexploded ordnance
UXOQCS	UXO Quality Control Supervisor
UXOSO	UXO safety officer
V	vanadium
VC	vinyl chloride
VOA	volatile organic analyte
VOC	volatile organic compound
VOH	volatile organic hydrocarbon
VQlfr	validation qualifier
VQual	validation qualifier
VX	nerve agent (O-ethyl-S-[diisopropylaminoethyl]-methylphosphonothiolate)
WAC	Women's Army Corps
Weston	Roy F. Weston, Inc.
WP	installation-wide work plan
WRS	Wilcoxon rank sum
WS	watershed
WSA	Watershed Screening Assessment
WWI	World War I
WWII	World War II
XRF	x-ray fluorescence
yd^3	cubic yards